DISCOVERY REPORTS

VOLUME IV

Cambridge University Press
Fetter Lane, London

New York
Bombay, Calcutta, Madras
Toronto
Macmillan

Tokyo
Maruzen Company, Ltd

DISCOVERY REPORTS

Issued by the Discovery Committee
Colonial Office, London
on behalf of the Government of the Dependencies
of the Falkland Islands

VOLUME IV

CAMBRIDGE
AT THE UNIVERSITY PRESS
1932

PRINTED IN GREAT BRITAIN

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[*Discovery Reports, Vol. IV, pp. 1-232, Plates I-V, July, 1932*]

DISCOVERY INVESTIGATIONS
STATION LIST

1929–1931

CONTENTS

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DISCOVERY INVESTIGATIONS STATION LIST

1929–1931

(Plates I–V)

INTRODUCTION

The following lists contain particulars of all stations made by the R.R.S. 'Discovery II' from January 1930 to May 1931, by the R.R.S. 'William Scoresby' from May 1929 to April 1931 and by the staff of the Marine Biological Station, South Georgia, from November 1930 to March 1931. Stations taken by the 'Discovery II' are entered first: they are numbered in continuation of those taken by the 'Discovery' in 1925–7 and have no letters prefixed to the numbers. Those of the 'William Scoresby' and the Marine Biological Station follow and are distinguished respectively by the prefixed letters WS and MS.

In most respects the lists are drawn up on the same lines as those previously published (vol. I, pp. 3–5, and vol. II, pp. 1, 2), but there are a few innovations in that for stations made by the 'Discovery II'. In this list the force of the wind is given in knots, as indicated by a Munro anemometer, instead of by Beaufort's scale, and both dry and wet bulb readings for air temperature are inserted. Soundings taken by the echo-sounding apparatus are distinguished by an asterisk.

Estimation of hydrogen-ion concentration was made by the colorimetric method, cresol red being used as indicator with McClendon's standards, and phosphate content was determined by Atkins' method. Nitrate was estimated by Harvey's method and nitrite with the Griess-Ilosvay reagent. Submarine illumination was measured photochemically by the decomposition of uranyl oxalate solutions.

The following symbols are used for nets and apparatus:

B	Oblique.
BNR	Russell's bottom tow-net. An **N** 100 net (see below) attached to a frame 4 ft. 10 in. (1·47 m.) long and 15 in. (38 cm.) wide, with skids on either side which keep the mouth 6 in. (15 cm.) above the bottom.
CWS	Water sample centrifuged for phytoplankton.
DC	Conical dredge. Mouth 16 in. in diameter (40·5 cm.) with canvas bag.
DGB	Depth gauge, Budenberg pattern.
DGP	Pressure depth gauge: a modification of the Budenberg pattern.
DLH	Large dredge. Heavy pattern, 4 ft. in length (1·2 m.).
H	Horizontal.
HH	Hand harpoon.
KT	Kelvin tube.
LH	Hand lines.
N 4-T, N 7-T	Nets with mesh of 4 or 7 mm. (0·16 in. or 0·28 in.) attached to back of trawl.

N 50	50 cm. tow-net. Mouth circular, 50 cm. in diameter (19·5 in.): 200 meshes to the linear inch.
N 70	70 cm. tow-net. Mouth circular, 70 cm. in diameter (27·5 in.): mesh graded, at cod-end 74 to the linear inch.
N 100	1 m. tow-net. Mouth circular, 1 m. in diameter (3·3 ft.): mesh graded, at cod-end of stramin with 10–12 meshes to the linear inch.
N 450	$4\frac{1}{2}$ m. tow-net. Mouth circular, $4\frac{1}{2}$ m. in diameter (14·8 ft.): mesh graded, cod-end of 7 mm. (0·28 in.) netting, lined for part of its length with 4 mm. (0·16 in.) netting.
ND	Dip net. A circular frame 2 m. in diameter (6·6 ft.) with a very shallow bag of coarse netting. Used on the bottom in shallow water with bait lashed to the centre of the netting.
NH	Hand net.
OTL	Large otter trawl. Head-rope 40 ft. long (12·2 m.): mesh at cod-end $1\frac{1}{4}$ in. (3·2 cm.).
Sh. Coll.	Shore collecting.
TD	Transparency (or Secchi) disc, 50 cm. in. diameter (19·5 in.).
TN	Fish-trap. Rectangular, with $\frac{1}{2}$ in. wire netting.
TYF	Young-fish trawl. A bag of stramin, with 10–12 meshes to the linear inch, attached to a circular frame 2 m. in diameter (6·6 ft.).
V	Vertical.

To the symbols for tow-nets (N 450, N 100, N 70, N 50 and TYF) B, H or V is always added to indicate the direction in which the haul was taken. For determining the depths of horizontal and oblique nets, Kelvin tubes or depth gauges were constantly employed. Their use is indicated by symbols in the "Remarks" column, and where no such symbol appears it is to be understood that the depth was estimated.

Time is expressed on the 24-hour system, the day ending with midnight (0000). In the list for the 'Discovery II' the difference* from Greenwich mean time is noted in the "Remarks" column, this difference holding good until another entry is made. In the 'William Scoresby' list the times are approximately local apparent time. In the columns for Biological Observations the entry under "from" states the time when all the warp was paid out. That under "to", with bottom nets and horizontal tow-nets, gives the time when hauling began; with oblique nets, or with any which were closed, the time is that when the haul ended—either by closure, or by arrival at the surface. When nets were hauled in the dark, the times are printed in heavy type.

At the end of the lists (p. 230) will be found a summary of the stations made by the 'Discovery II' and 'William Scoresby' with references to the charts on which the positions are marked.

* To convert ship's time to G.M.T. the figure in the "Remarks" column is to be added or subtracted according to sign.

R.R.S. 'DISCOVERY II', STATIONS 300–700
R.R.S. 'WILLIAM SCORESBY', STATIONS WS 434–575
MARINE BIOLOGICAL STATION, STATIONS MS 83–106

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
300	52° 26½′ S, 37° 14′ W	1930 20 i	1730	2258 h.	N	12	N	1–2	c.	990·1	4·1	3·9	mod. W swell
			2122	—	NW	9	NW	2	c.	990·7	3·8	3·6	,,
301	52° 36½′ S, 37° 14′ W	20–21 i	2210	1858 h.	NNW	11	NNW	1–2	c.	990·7	3·7	3·6	mod. conf. swell
			0230	—	NNW	11	NNW	1–2	c. d.	990·0	3·6	3·5	,,
302	52° 46½′ S, 37° 12′ W	21 i	0345	2213 di. Oz.	NW	15	NW	1–2	o.	990·1	3·6	3·6	mod. conf. swell
			0838	—	W	16	W	1–2	o.	991·7	4·2	4·0	,,
303	53° 00′ S, 37° 11′ W	21 i	1013	2750 h.	W × N	18	W × N	1–2	o.	991·5	4·0	3·8	mod. NW swell
			1430	—	WNW	19	WNW	3	o. m.	991·5	5·0	4·5	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
300	21	0	2·92	33·84	26·99	8·07	83	—	**N 50 V**	100–0	1730	—	+ 2 hours G.M.T.
		10	2·88	33·84	26·99	8·07	75	—	**N 70 V**	50–0			
		20	2·84	33·85	27·00	8·07	66	—	,,	100–50			
		30	2·60	33·85	27·02	8·07	89	—	,,	250–100			
		40	2·55	33·85	27·02	8·07	85	—	,,	500–250			
		50	2·50	33·86	27·03	8·07	86	—	,,	750–500			
		60	2·35	33·86	27·04	8·07	93		,,	1000–750	—	2036	
		80	0·40	33·94	27·25	7·97	111		**N 70 B**	100–0	2058	2122	
		100	–0·10	33·97	27·30	7·97	128		**N 100 B**				
		150	0·45	34·14	27·41	7·87	125						
		200	1·38	34·37	27·53	7·82	129						
		300	1·70	34·51	27·62	7·82	129						
		400	1·72	34·58	27·68	7·82	144						
		600	1·97	34·72	27·77	7·84	134						
		800	1·80	34·72	27·78	7·83	130						
		1000	1·63	34·69	27·77	7·94	126						
		1500	1·01	34·69	27·81	7·87	125						
		2000	0·64	34·69	27·83	7·84	125						
301	21	0	2·85	33·84	26·99	8·08	79	6·64	**N 50 V**	100–0	**2234**		
		10	2·70	33·84	27·00	8·08	71	7·60	**N 70 V**	50–0			
		20	2·68	33·84	27·01	8·08	71	7·89	,,	100–50			
		30	2·65	33·85	27·01	8·08	69	—	,,	250–100			
		40	2·65	33·84	27·01	8·08	76	7·23	,,	500–250			
		50	2·60	33·85	27·02	8·08	79	—	,,	750–500			
		60	2·45	33·86	27·03	8·08	85	7·20	,,	1000–750	—	**0155**	
		80	1·10	33·91	27·18	8·00	93	—	**N 70 B**	110–0	**0237**	**0257**	KT
		100	–0·20	34·02	27·35	7·98	123	7·51	**N 100 B**				
		150	0·60	34·18	27·43	7·88	126						
		200	1·62	34·40	27·54	7·86	139	5·01					
		300	1·80	34·53	27·63	7·83	137						
		400	1·88	34·56	27·65	7·85	139	4·28					
		600	1·97	34·70	27·76	7·95	134	3·50					
		800	1·81	34·72	27·78	7·95	125	3·24					
		1000	1·66	34·72	27·79	—	133	2·72					
		1500	0·98	34·72	27·84	7·88	129	3·79					
		1750	0·74	34·72	27·86	7·88	134	3·70					
302	21	0	2·81	33·84	27·00	8·08	69	—	**N 50 V**	100–0	0415		
		10	2·78	33·84	27·00	8·08	68	—	**N 70 V**	50–0			
		20	2·72	33·84	27·00	8·08	71	—	,,	100–50			
		30	2·60	33·84	27·01	8·08	98	—	,,	250–100			
		40	2·58	33·84	27·01	8·08	85	—	,,	500–250			
		50	2·50	33·84	27·02	8·08	90	—	,,	750–500			
		60	2·48	33·84	27·02	8·06	83	—	,,	1000–750	—	0648	
		80	0·90	33·85	27·14	8·00	109	—	**N 70 B**	165–0	0907	0927	KT
		100	–0·22	33·93	27·27	7·97	119	—	**N 100 B**				
		150	–0·18	34·11	27·42	7·89	123						
		200	0·72	34·25	27·48	7·83	132						
		300	1·66	34·42	27·54	7·80	132						
		400	1·78	34·54	27·65	7·79	137						
		600	2·01	34·65	27·71	7·88	144						
		800	1·91	34·67	27·74	7·86	136						
		1000	1·76	34·69	27·76	7·88							
		1500	1·27	34·67	27·78	7·88							
		2000	0·80	34·65	27·79	7·90	133						
303	21	0	2·95	33·84	26·98	8·09	73	6·04	**N 50 V**	100–0	1048		
		10	2·95	33·84	26·98	8·09	71	—	**N 70 V**	50–0			
		20	2·92	33·84	26·99	8·09	64	7·08	,,	100–50			
		30	2·80	33·85	27·00	8·09	76	—	,,	250–100			
		40	2·70	33·84	27·00	8·09	74	6·96	,,	500–250			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
303 *cont.*	53° 00′ S, 37° 11′ W	1930 21 i											
304	53° 06′ S, 37° 14′ W	21 i	1540	2916 di. Oz.	NW × W	16	WNW	3–4	c. m.	991·4	5·0	5·0	mod. NW swell
			1945	—	NW	13	NW	3	c.	991·3	4·2	4·2	,,
305	53° 17′ S, 37° 10′ W	21–22 i	2115	1811	NW	13	NW	2–3	c.	991·3	3·8	3·8	mod. NW swell
306	53° 28′ S, 37° 07′ W	22 i	0140	790 gy. S. M.	WNW	16	WNW	3–4	o.	990·8	3·7	3·5	mod. NW swell
			0430	—	WNW	18	WNW	3–4	o.	990·6	3·6	3·4	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
303 *cont.*	21	50	2·45	33·84	27·02	8·04	84	—	**N 70 V**	750–500			
		60	1·55	33·87	27·12	8·04	91	7·46	,,	1000–750	—	1250	
		80	0·40	33·93	27·24	7·98	108	—	**N 70 B**	119–0	1439	1459	KT
		100	−0·05	34·02	27·34	7·95	113	7·25	**N 100 B**				
		150	0·50	34·25	27·49	7·85	137						
		200	1·05	34·29	27·49	7·82	137	5·17					
		300	1·65	34·52	27·63	7·78	151						
		400	1·80	34·56	27·65	7·75	145	4·31					
		600	1·96	34·56	27·64	7·88	129	3·53					
		800	1·91	34·69	27·75	7·92	125	3·70					
		1000	1·69	34·72	27·79	7·93	125	3·67					
		1500	1·24	34·69	27·79	7·88	139	4·42					
		2000	0·86	34·65	27·79	7·92	139	4·39					
		2500	0·59	34·63	27·79	7·92	139	4·36					
304	22	0	3·10	33·82	26·96	8·08	85	—	**N 50 V**	100–0	1555		
		10	3·05	33·82	26·96	8·08	83	—	**N 70 V**	50–0			
		20	3·00	33·83	26·97	8·07	85	—	,,	100–50			
		30	2·90	33·83	26·98	8·08	83	—	,,	250–100			
		40	2·80	33·82	26·99	8·08	78	—	,,	500–250			
		50	2·50	33·84	27·02	8·08	85	—	,,	750–500			
		60	1·85	33·84	27·07	8·03	86	—	,,	1000–750	—	1823	
		80	0·10	33·89	27·22	7·93	116	—	**N 70 B**	146–0	1956	2016	KT
		100	−0·30	33·93	27·27	7·88	123	—	**N 100 B**				
		150	0·35	34·13	27·40	7·83	125						
		200	1·05	34·29	27·49	7·80	132						
		300	1·70	34·42	27·54	7·80	137						
		400	1·80	34·54	27·64	7·77	151						
		600	1·97	34·63	27·70	7·78	147						
		800	1·91	34·69	27·75	7·80	137						
		1000	1·75	34·69	27·76	7·88	137						
		1500	1·35	34·67	27·78	7·88	137						
		2000	0·94										
305	22	0	3·30	33·78	26·91	8·08	84	6·31	**N 50 V**	100–0	**2130**		
		10	3·30	33·78	26·91	8·08	83	8·29	**N 70 V**	50–0			
		20	3·15	33·79	26·93	8·08	76	7·46	,,	100–50			
		30	2·95	33·78	26·94	8·08	80	—	,,	250–100			
		40	2·92	33·78	26·95	8·08	85	6·95	,,	500–250			
		50	2·90	33·78	26·95	8·06	84	—	,,	750–500			
		60	2·55	33·80	26·99	8·04	81	6·37	,,	1000–750	—	**2353**	
		80	1·60	33·80	27·06	8·01	96	—	**N 70 B**	100–0	**0026**	**0046**	
		100	0·15	33·95	27·27	7·90	139	7·15	**N 100 B**				
		150	0·20	34·10	27·39	7·85	144						
		200	1·32	34·27	27·46	7·80	145	5·02					
		300	1·70	34·45	27·57	7·77	145						
		400	1·95	34·54	27·63	7·77	147	3·96					
		600	2·02	34·62	27·69	7·84	140	3·73					
		800	1·96	34·70	27·76	7·86	140	3·93					
		1000	1·82	34·70	27·77	7·88	140	3·85					
		1500	1·47	34·72	27·81	7·88	136	4·28					
306	22	0	3·20	33·78	26·92	8·06	86	—	**N 50 V**	100–0	**0150**		
		10	3·20	33·78	26·92	8·06	88	—	**N 70 V**	50–0			
		20	3·20	33·77	26·90	8·05	86	—	,	100–50			
		30	3·12	33·78	26·93	8·05	85	—	,,	250–100			
		40	2·95	33·79	26·95	8·05	81	—	,,	500–250			
		50	2·55	33·80	26·99	8·02	86	—	,,	750–500	—	0418	
		60	1·50	33·80	27·06	7·98	105	—	**N 70 B**	168–0	0450	0510	KT
		80	0·80	33·84	27·14	7·93	109	—	**N 100 B**				
		100	0·05	33·93	27·26	7·88	126						
		150	0·68	34·05	27·32	7·81	125						

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
306 *cont.*	53° 28′ S, 37° 07′ W	1930 22 i											
307	53° 36′ S, 37° 04′ W	22 i	0548	187 R.	WNW	20	WNW	5	b. c.	990·9	3·6	3·0	mod. WNW swell
308	54° 07¼′ S, 36° 24½′ W	24 i	1210	121 gy. M.	SW	17	SW	1–2	b.	1010·4	3·5	2·3	mod. WSW swell
309	54° 00½′ S, 36° 12′ W	24 i	1500	254 gn. M.	NNE	10	conf.	0–1	b.	1011·6	3·6	2·8	mod. conf. swell
310	53° 53½′ S, 36° 00′ W	24 i	1733	150 R.	NNE	12	conf.	0–1	b.	1014·1	3·3	2·7	mod. conf. swell
311	53° 47′ S, 35° 48½′ W	24 i	1955	697 gn. M. S.	NNE	10	NNE	0–1	b.	1014·2	2·9	2·5	heavy conf. WNW swell
			2254	—	WNW	10	WNW	3	b.	1015·6	2·2	2·0	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
306 *cont.*	22	200	1·22	34·23	27·43	7·79	130						
		300	1·80	34·40	27·52	7·76	133						
		400	1·94	34·47	27·57	7·78	132						
		600	1·98	34·56	27·64	7·79	144						
		700	1·97	34·60	27·67	7·80	142						
307	22	0	3·20	33·74	26·88	8·07	79	8·29	**N 50 V**	100–0	0605		
		10	3·20	33·75	26·89	8·07	73	8·15	**N 70 V**	50–0			
		20	3·20	33·78	26·92	8·07	73	8·03	,,	100–50			
		30	3·18	33·78	26·92	8·05	79	—	,,	180–100	—	0708	
		40	2·80	33·78	26·96	8·04	80	7·25	**N 70 B**	137–0	0732	0748	KT
		50	2·60	33·78	26·97	8·04	91	—	**N 100 B**				
		60	1·48	33·80	27·07	7·98	94	7·58					
		80	0·80	33·86	27·15	7·92	98						
		100	0·25	34·00	27·31	7·88	130	6·89					
		150	0·60	34·11	27·37	7·81	137						
		175	0·95	34·16	27·39	7·81	133	6·67					
308	25	0	3·25	33·71	26·86	8·12	81	6·60	**N 50 V**	100–0	1223		
		10	3·18	33·73	26·88	8·12	85	7·15	**N 70 V**	50–0			
		20	3·02	33·73	26·89	8·12	80	7·23	,,	100–50	—	1250	
		30	2·45	33·80	27·00	8·09	85	—	**N 70 B**	106–0	1336	1420	KT
		40	1·93	33·80	27·04	8·08	90	7·12	**N 100 B**				
		50	1·90	33·81	27·05	8·06	95						
		60	1·70	33·84	27·09	8·06	109	6·74					
		80	1·60	33·89	27·13	8·04	105						
		100	1·40	33·89	27·15	8·03	108	6·34					
		115	0·93	33·89	27·18	8·02	123	6·28					
309	25	0	3·48	33·77	26·88	8·10	80	—	**N 50 V**	100–0	1517		
		10	3·28	33·77	26·90	8·10	94	—	**N 70 V**	50–0			
		20	3·18	33·77	26·91	8·10	86	—	,,	100–50			
		30	2·62	33·77	26·96	8·09	85	—	,,	240–100	—	1537	
		40	1·87	33·77	27·02	8·06	94	—	**N 70 B**	137–0	1614	1636	KT
		50	1·62	33·80	27·06	8·06	110	—	**N 100 B**				
		60	1·15	33·80	27·09	8·04	101						
		80	0·62	33·93	27·23	7·99	118						
		100	0·35	33·98	27·29	7·96	119						
		150	0·55	34·11	27·38	7·92	133						
		200	1·23	34·31	27·50	7·83	160						
		240	1·50	34·34	27·50	7·81	158						
310	25	0	3·50	33·78	26·89	8·12	90	6·51	**N 50 V**	100–0	1743		
		10	3·25	33·77	26·90	8·12	86	7·34	**N 70 V**	50–0			
		20	3·15	33·77	26·91	8·11	86	6·74	,,	100–50			
		30	3·02	33·77	26·92	8·11	95	—	,,	145–100	—	1815	
		40	2·90	33·80	26·96	8·10	100	7·26	**N 70 B**	133–0	1840	1859	KT
		50	1·61	33·81	27·07	8·06	101	—	**N 100 B**				
		60	0·58	33·85	27·17	8·00	114	7·03					
		80	0·45	34·02	27·31	7·94	130						
		100	0·50	34·05	27·33	7·93	126	6·34					
		145	0·81	34·16	27·40	7·90	137	5·22					
311	25	0	3·25	33·76	26·90	8·11	74	—	**N 50 V**	100–0	2002		
		10	3·05	33·76	26·91	8·11	73	—	**N 70 V**	50–0			
		20	3·00	33·75	26·91	8·10	71	—	,,	100–50			
		30	2·85	33·75	26·92	8·09	80	—	,,	250–100			
		40	2·50	33·75	26·95	8·09	84	—	,,	500–250			
		50	1·15	33·76	27·06	8·04	108	—	,,	690–500	—	**2135**	
		60	0·92	33·78	27·09	8·03	104	—	**N 70 B**	146–0	**2225**	**2252**	KT
		80	0·32	33·80	27·14	8·00	118	—	**N 100 B**	139–0	**2145**	**2206**	KT
		100	0·40	33·87	27·20	7·97	134						

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
311 *cont.*	53° 47½′ S, 35° 48½′ W	1930 24 i											
312	53° 39¾′ S, 35° 37½′ W	24–25 i	2340	2092 G.	WNW	15	WNW	3	b.	1016·1	2·3	1·8	heavy WNW swell. Large tabular berg abeam
			0348	—	NW	14	NW	3	b.	1015·4	2·4	2·4	heavy NW swell
313	53° 32½′ S, 35° 24½′ W	25 i	0520	3519 di. Oz.	NNW	17	NNW	3	o. r.	1014·9	2·6	2·6	heavy NW swell
			1000	—	N	24	NNW	4	o. r.	1008·3	3·0	3·0	,,
314	53° 56′ S, 37° 14′ W	29 i	0824	108 M. S. St.	WSW	5	—	0–1	b. c.	1012·1	4·0	3·5	mod. WSW swell
315	53° 46′ S, 37° 14′ W	29 i	1037	161 M. S. St.	WSW	8	WSW	1–2	b.	1011·8	3·7	3·3	mod. SW swell

Station	Age of moon (days)	Hydrological observations: Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	Biological observations: Gear	Depth (metres)	Time: From	Time: To	Remarks
311 *cont.*	25	150	0·80	34·04	27·31	7·92	137						
		200	1·30	34·18	27·39	7·86	132						
		300	1·90	34·40	27·52	7·85	140						
		400	1·95	34·45	27·56	7·87	130						
		600	2·00	34·54	27·63								
312	25	0	2·45	33·85	27·04	8·10	86	4·53	**N 50 V**	100–0	**2350**		
		10	2·45	33·84	27·03	8·09	80	6·29	**N 70 V**	50–0			
		20	2·45	33·87	27·05	8·09	91	—	,,	100–50			
		30	2·30	33·90	27·09	8·09	79	—	,,	220–100			
		40	1·90	33·91	27·13	8·07	98	5·78	,,	500–250	—	**0345**	
		50	1·68	33·90	27·14	8·07	96	—	**N 70 B**	150–0	0401	0423	KT
		60	1·20	33·92	27·19	8·06	116	7·51	**N 100 B**				
		80	0·60	33·96	27·26	8·02	121						
		100	0·40	34·09	27·37	7·96	139						
		150	1·05	34·26	27·47	7·88	145						
		200	1·55	34·41	27·55	7·88	140	6·57					
		300	1·88	34·51	27·61	7·84	147						
		400	1·95	34·55	27·64	7·86	140	4·13					
		600	2·00	34·67	27·73	7·88	133	3·32					
		1500	1·40	34·70	27·80	8·04	124	4·34					
313	25	0	2·55	33·84	27·02	8·10	108	—	**N 50 V**	100–0	0530		
		10	2·55	33·86	27·04	8·10	106	—	**N 70 V**	50–0			
		20	2·45	33·86	27·04	8·09	100	—	,,	100–50			
		30	2·30	33·86	27·06	8·09	96	—	,,	250–100			
		40	2·20	33·87	27·07	8·07	100	—	,,	500–250			
		50	1·45	33·87	27·13	8·05	111	—	,,	750–500			
		60	1·21	33·93	27·19	8·04	109	—	,,	1000–750	—	0720	
		80	0·35	33·93	27·24	7·98	125	—	**N 70 B**	164–0	0947	1010	KT
		100	0·20	34·04	27·34	7·94	145	—	**N 100 B**				
		150	0·75	34·18	27·42	7·88	174						
		200	0·96	34·23	27·45	7·87	151						
		300	1·89	34·44	27·55	7·82	169						
		400	1·98	34·54	27·63	7·81	167						
		600	2·06	34·61	27·68	7·88	147						
		1500	1·92	34·67	27·74	7·93	137						
		2000	0·83	34·68	27·82	7·90	152						
		2500	0·52	34·67	27·83	7·91	144						
		3000	0·37	34·65	27·83	7·93	142						
314	29	0	2·46	33·80	26·99	8·09	113	—	**N 50 V**	100–0	0845		
		10	2·40	33·78	26·99	8·09	110	—	**N 70 V**	50–0			
		20	2·20	33·78	27·00	8·09	111	—	,,	100–50	—	0910	
		30	1·90	33·82	27·06	8·09	116	—	**N 70 B**	106–0	0919	0935	KT
		40	1·85	33·85	27·08	8·05	123	—	**N 100 B**				
		50	1·80	33·85	27·08	8·06	114						
		60	1·56	33·87	27·12	8·03	118						
		80	1·18	33·92	27·18	8·02	126						
		100	1·18	33·95	27·21	8·02	124						
315	29	0	3·28	33·78	26·91	8·12	76	7·52	**N 50 V**	100–0	1040		
		10	3·00	33·78	26·94	8·12	61	7·41	**N 70 V**	50–0			
		20	2·90	33·77	26·93	8·13	80	7·18	,,	100–50			
		30	2·70	33·77	26·94	8·10	84	—	,,	150–100	—	1116	
		40	2·15	33·77	26·99	8·10	95	7·03	**N 70 B**	91–0	1142	1200	KT
		50	1·75	33·85	27·08	8·08	99	—	**N 100 B**				
		60	1·18	33·89	27·16	8·06	115	6·86					
		80	0·72	33·96	27·25	8·02	125						
		100	0·65	33·96	27·25	7·99	125	6·42					
		150	0·65	34·05	27·32	7·96	137	5·76					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
316	53° 54½′ S, 38° 01′ W	1930 29 i	1515	119 M. S. St.	NW	3	NW	0–1	b.	1012·0	4·5	4·0	mod. W swell
317	53° 47¼′ S, 38° 12½′ W	29 i	1730	265 gy. M.	N	10	N	1–2	b. c.	1013·7	4·0	3·8	mod. W swell
318	53° 39′ S, 38° 24½′ W	29 i	2000	166 gy. M. S.	NNE	13	NNE	1–2	b.	1013·3	3·5	3·5	mod. conf. swell
319	53° 37′ S, 38° 39½′ W to 53° 33½′ S, 38° 37′ W	29–30 i	2250	2408 di. Oz.	NNE	22	NNE	4	c.	1007·2	4·0	3·8	mod. W swell
			0230	—	NNE	19	NNE	3	c. z.	1010·8	3·5	3·5	,,
320	53° 10½′ S, 39° 44½′ W	30 i	1601	3932 di. Oz.	NNE	11	NNE	2	b. c. m.	993·0	5·6	4·9	mod. NE swell
			2010	—	NE	18	NE	2	b. c. m.	990·3	5·1	4·9	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
316	0	0	2·84	33·81	26·97	8·12	78	7·72	**N 50 V**	100–0	1525		
		10	2·28	33·81	27·02	8·12	79	7·26	**N 70 V**	50–0			
		20	2·22	33·81	27·02	8·12	93	7·38	,,	100–50	—	1545	
		30	2·12	33·83	27·05	8·11	83	—	**N 70 B**	106–0	1615	1634	KT
		40	1·72	33·85	27·08	8·09	95	—	**N 100 B**				
		50	1·48	33·86	27·11	8·07	94						
		60	0·82	33·93	27·21	8·03	111	6·63					
		80	0·58	33·96	27·26	7·98	113						
		100	0·56	34·02	27·31	7·96	115	6·52					
317	0	0	3·08	33·85	26·98	8·22	68	—	**N 50 V**	100–0	1745		
		10	2·76	33·84	27·00	8·18	68	—	**N 70 V**	50–0			
		20	2·68	33·85	27·01	8·19	70	—	,,	100–50			
		30	2·65	33·84	27·01	8·19	69	—	,,	250–100	—	1820	
		40	2·60	33·84	27·01	8·18	74	—	**N 70 B**	130–0	1842	1901	KT
		50	2·18	33·84	27·05	8·13	74	—	**N 100 B**				
		60	1·55	33·85	27·10	8·09	88						
		80	0·60	33·98	27·27	8·03	125						
		100	0·41	34·04	27·33	8·00	128						
		150	0·56	34·12	27·38	7·94	144						
		200	0·95	34·23	27·45	7·89	144						
		250	1·05	34·27	27·48	7·88	145						
318	0	0	3·10	33·85	26·98	8·18	93	6·75	**N 50 V**	100–0	2010		
		10	2·70	33·85	27·01	8·18	90	7·19	**N 70 V**	50–0			
		20	2·70	33·85	27·01	8·18	86	7·05	,,	100–50			
		30	2·60	33·85	27·02	8·17	105	—	,,	150–100	—	2050	
		40	2·55	33·85	27·02	8·16	94	7·07	**N 70 B**	104–0	**2133**	**2152**	KT
		50	2·30	33·85	27·04	8·14	93	—	**N 100 B**				
		60	1·75	33·93	27·15	8·09	116	6·66					
		80	0·65	34·03	27·31	7·98	125						
		100	0·50	34·05	27·33	7·96	130	6·32					
		150	0·62	34·12	27·38	7·92	156	5·69					
319	0	0	3·38	33·85	26·95	8·15	73	—	**N 50 V**	100–0	**2253**		
		10	3·42	33·85	26·94	8·16	78	—	**N 70 V**	50–0			
		20	3·35	33·85	26·95	8·16	71	—	,,	100–50			
		30	3·10	33·85	26·98	8·15	70	—	,,	250–100			
		40	3·08	33·85	26·98	8·15	76	—	,,	500–250			
		50	3·05	33·85	26·98	8·15	73	—	,,	750–500			
		60	3·00	33·85	26·99	8·15	75	—	,,	1000–750	—	**0116**	
		80	2·78	33·88	27·03	8·14	84	—	**N 70 B**	168–0	**0241**	**0301**	KT
		100	1·08	33·89	27·16	8·09	125	—	**N 100 B**				
		150	0·08	34·04	27·35	7·97	132						
		200	0·92	34·26	27·47	7·89	152						
		300	1·85	34·43	27·55	7·85	164						
		400	2·00	34·54	27·63	7·84	158						
		600	1·98	34·57	27·65	7·85	162						
		800	1·92	34·68	27·74	7·87	156						
		1000	1·79	34·70	27·77	7·90	158						
		1500	1·47	34·70	27·80	7·92	158						
		2000	1·02	34·70	27·83	7·95	158						
320	1	0	3·85	33·80	26·86	8·18	71	—	**N 50 V**	100–0	1610		
		10	3·88	33·80	26·86	8·20	69	—	**N 70 V**	50–0			
		20	3·72	33·79	26·87	8·19	63	—	,,	100–50			
		30	3·70	33·79	26·88	8·18	68	—	,,	250–100			
		40	3·65	33·80	26·89	8·18	74	—	,,	500–250			
		50	3·60	33·80	26·89	8·18	74	—	,,	750–500			
		60	3·48	33·80	26·90	8·18	81	—	,,	1000–750	—	1806	
		80	2·02	33·82	27·05	8·13	108	—	**N 70 B**	119–0	1955	2015	KT
		90	0·88	33·82	27·13	8·05	108	—	**N 100 B**				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
320 *cont.*	53° 10½′ S, 39° 44½′ W	1930 30 i											
321	53° 17′ S, 39° 31′ W	30–31 i	2106	4117 di. Oz.	NE × N	18	NE	2	c.	989·3	5·1	4·8	mod. NE swell
			0326	—	NE	19	NE	3	o. q. p. r.	984·8	4·8	4·7	heavy conf. N swell
322	53° 24½′ S, 39° 17½′ W to 53° 27′ S, 39° 22′ W	31 i	0442	3274 sm. St.	NE N	17	NNE	4	o. m. d.	984·4	4·2	4·2	heavy conf. NE and NW swell
			0925	—	E	11	E	2–3	o. f.	984·4	4·3	4·3	”
323	53° 28′ S, 38° 55′ W to 53° 29′ S, 38° 55½′ W	31 i	1100	2935 sm. St.	ESE	8	ESE	1–2	o. f.	985·4	4·1	4·1	heavy W and mod. NE swell
			1417	—	SE	8	SE	1–2	o. f.	984·6	4·0	3·8	heavy W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
320 *cont.*	1	100	−0·08	33·86	27·20	7·99	125						
		150	−0·50	34·00	27·34	7·92	126						
		200	0·25	34·20	27·47	7·89	134						
		300	1·30	34·45	27·60	7·85	142						
		400	1·62	34·58	27·69	7·84	147						
		600	1·77	34·67	27·75	7·92	147						
		800	1·76	34·70	27·78	7·92	136						
		1000	1·53	34·70	27·80	7·92	134						
		1500	1·04	34·71	27·83	7·91	133						
		2000	0·66	34·70	27·85	7·93	130						
		2500	0·42	34·69	27·84	8·02	132						
		3000	0·23	34·69	27·86	8·04	137						
		3500	0·10	34·68	27·86	8·03	140						
321	1	0	4·00	33·82	26·87	8·20	40	6·22	**N 50 V**	100–0	**2119**		
		10	3·95	33·82	26·87	8·19	56	6·49	**N 70 V**	50–0			
		20	3·90	33·82	26·88	8·19	55	6·40	,,	100–50			
		30	3·82	33·82	26·89	8·18	60	—	,,	250–100			
		40	3·52	33·82	26·92	8·16	70	6·65	,,	500–250			
		50	3·40	33·82	26·93	8·16	78	—	,,	750–500			
		60	3·40	33·82	26·93	8·16	76	6·46	,,	1000–750	—	**2352**	
		80	1·85	33·87	27·10	8·11	105	—	**N 70 B**	135–0	**0310**	**0330**	KT
		100	−0·28	33·89	27·24	8·00	145	6·33	**N 100 B**				
		150	−0·52	34·06	27·39	7·92	140						
		200	0·12	34·16	27·44	7·90	145	6·30					
		300	1·62	34·49	27·61	7·85	149						
		400	1·82	34·57	27·66	7·85	151	4·05					
		600	1·86	34·66	27·73	7·88	145	3·475					
		800	1·70	34·69	27·76	7·96	133	3·69					
		1000	1·58	34·70	27·79	7·96	144	3·72					
		1500	1·05	34·71	27·83	7·96	147	3·99					
		2000	0·82	34·70	27·84	8·00	142	3·89					
		2500	0·52	34·70	27·86	8·01	149						
		3000	0·37	34·68	27·85	8·02	154	3·83					
		3800	−0·01	34·68	27·87	8·03	142	2·79					
322	1	0	3·61	33·81	26·90	8·18	75	—	**N 50 V**	100–0	0455		
		10	3·58	33·81	26·90	8·18	71	—	**N 70 V**	50–0			
		20	3·58	33·81	26·90	8·16	68	—	,,	100–50			
		30	3·58	33·81	26·90	8·16	68	—	,,	250–100			
		40	3·55	33·81	26·91	8·15	71	—	,,	500–250			
		50	3·53	33·83	26·92	8·15	75	—	,,	750–500			
		60	3·52	33·83	26·92	8·15	70	—	,,	1000–750	—	0745	
		80	3·32	33·83	26·94	8·13	81	—	**N 70 B**	113–0	0904	0924	KT
		100	0·58	33·91	27·22	8·04	110	—	**N 100 B**				
		150	0·12	34·09	27·38	7·92	126						
		200	0·98	34·27	27·48	7·89	140						
		300	1·70	34·43	27·56	7·84	136						
		400	1·88	34·54	27·64	7·84	134						
		600	1·93	34·67	27·73	7·87	144						
		800	1·80	34·69	27·75	7·88	147						
		1000	1·67	34·71	27·79	7·92	144						
		1500	1·13	34·73	27·84	7·94	140						
		2000	0·74	34·73	27·87	7·94	144						
		2500	0·45	34·70	27·86	8·02	140						
		3000	0·22	34·67	27·85	7·95	140						
323	2	0	3·38	33·80	26·91	8·18	79	6·835	**N 50 V**	100–0	1105		
		10	3·35	33·83	26·94	8·17	79	6·78	**N 70 V**	50–0			
		20	3·35	33·82	26·94	8·16	76	6·85	,,	100–50			
		30	3·30	33·82	26·94	8·15	78	—	,,	250–100			
		40	3·28	33·82	26·94	8·15	81	6·86	,,	500–250			

3

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
323 *cont.*	53° 28′ S, 38° 55′ W to 53° 29′ S, 38° 55½′ W	1930 31 i											
324	54° 56′ S, 39° 57′ W to 54° 56′ S, 40° 01′ W	1 ii	0850	3010 di. Oz.	E	18	E	3–4	o. r.	963·7	2·8	2·8	heavy conf. swell
			1250	—	S × E	20	conf.	3–4	o. r. s.	968·4	1·4	1·3	,,
325	54° 53′ S, 39° 40′ W to 54° 51′ S, 39° 37′ W	1 ii	1403	2822 di. Oz. sm. St.	SSW	19	conf.	3–4	o. r. s.	968·7	2·0	1·8	mod. conf. swell
			1819	—	SW	31	SW	5	o.	975·1	2·4	2·2	heavy conf. swell
326	54° 33′ S, 38° 29½′ W to 54° 32½′ S, 38° 28′ W	2 ii	0130	216 gn. M.	SW	18	SW	5	o. d	977·5	3·5	3·5	heavy SW swell
			0415	—	WSW	18	WSW	5	o. d.	979·0	3·5	3·2	mod. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. C.	S ‰	σt	pH	P_2O_5 mgm. p.m.[3]	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
323 *cont.*	2	50	3·00	33·82	26·97	8·13	85	—	**N 70 V**	750–500			
		60	1·50	33·83	27·09	8·09	105	6·52	,,	1000–750	—	1247	
		80	0·50	33·91	27·22	7·99	134	—	**N 70 B**	93–0	1358	1418	KT
		100	−0·15	34·00	27·33	7·94	142	6·32	**N 100 B**				
		150	−0·35	34·20	27·49	7·89	152						
		200	1·35	34·33	27·50	7·84	149	4·61					
		300	1·81	34·50	27·60	7·85	164						
		400	1·96	34·57	27·65	7·86	154	3·72					
		600	1·96	34·62	27·70	7·90	137	3·47					
		800	1·84	34·65	27·72	7·90	137	3·90					
		1000	1·62	34·70	27·79	7·92	144	3·875					
		1500	1·08	34·70	27·82	7·92	142	4·26					
		2000	0·79	34·70	27·84	7·92	140	4·29					
		2500	0·50	34·69	27·84	7·92	147	4·59					
324	2	0	3·10	33·86	26·99	8·15	99	—	**N 50 V**	100–0	0855		
		10	3·10	33·85	26·98	8·14	99	—	**N 70 V**	50–0			
		20	3·10	33·86	26·99	8·14	103	—	,,	100–50			
		30	3·05	33·86	26·99	8·12	98	—	,,	250–100			
		40	2·98	33·87	27·01	8·12	107	—	,,	500–250			
		50	1·35	33·92	27·18	8·10	123	—	,,	750–500			
		60	0·92	33·92	27·20	8·07	121	—	,,	1000–750	—	1215	
		80	−0·22	33·97	27·31	8·00	123	—	**N 70 B**	142–0	1230	1250	KT
		100	−0·28	34·01	27·34	7·97	141	—	**N 100 B**				
		150	0·38	34·18	27·45	7·92	149						
		200	1·38	34·32	27·49	7·89	133						
		300	1·55	34·45	27·59	7·85	146						
		400	1·69	34·51	27·62	7·84	147						
		600	1·93	34·63	27·70	7·85	142						
		800	1·93	34·71	27·77	7·86	146						
		1000	1·80	34·71	27·78	7·93	134						
		1500	1·39	34·73	27·82	7·94	135						
		2000	0·88	34·73	27·86	7·95	137						
		2500	0·48	34·72	27·87	7·95	134						
325	3	0	3·32	33·87	26·98	8·13	97	6·89	**N 50 V**	100–0	1411		
		10	3·32	33·87	26·98	8·11	90	6·95	**N 70 V**	50–0			
		20	3·32	33·87	26·98	8·11	98	7·06	,,	100–50			
		30	3·32	33·87	26·98	8·11	101	—	,,	250–100			
		40	3·20	33·92	27·03	8·10	88	6·92	,,	500–250			
		50	3·20	33·94	27·04	8·10	96	—	,,	750–500			
		60	2·80	33·94	27·08	8·08	102	6·93	,,	1000–750	—	1551	
		80	0·60	33·96	27·26	8·02	120	—	**N 70 B**	137–0	1758	1818	KT
		100	0·25	34·01	27·31	7·99	121	6·53	**N 100 B**				
		150	0·52	34·12	27·39	7·94	125						
		200	1·32	34·21	27·41	7·90	125	5·54					
		300	1·88	34·38	27·51	7·88	127						
		400	2·08	34·47	27·56	7·87	141	4·22					
		600	2·13	34·47	27·56	7·89	121	3·98					
		800	2·05	34·52	27·60	7·90	133	3·99					
		1000	2·09	34·60	27·67	7·90	134						
		1500	1·85	34·71	27·77	7·91	121	3·70					
		2000	1·36	34·73	27·83	7·93	120	4·08					
		2500	0·94	34·72	27·85	7·94	124	4·31					
		2750	0·67	34·71	27·86	8·03	125	4·28					
326	3	0	3·35	33·86	26·97	8·12	84	7·47	**N 50 V**	100–0	**0139**		
		10	3·35	33·86	26·97	8·11	87	6·52	**N 70 V**	50–0			
		20	3·35	33·86	26·97	8·11	87	5·79	,,	100–50			
		30	3·35	33·86	26·97	8·12	87	—	,,	200–100	—	**0216**	
		40	3·35	33·86	26·97	8·10	88	6·90	**N 70 B**	81–0	**0355**	**0417**	KT. For N 100 B see St. 330
		50	3·35	33·86	26·97	8·10	91						

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
326 *cont.*	54° 33′ S, 38° 29½′ W to 54° 32½′ S, 38° 28′ W	1930 2 ii											
327	54° 26½′ S, 38° 06′ W to 54° 25′ S, 38° 03′ W	2 ii	0538	216 h.	W × S	23	WSW	5	o.	980·6	3·5	3·2	mod. conf. NW and W swell
328	54° 20½′ S, 37° 42½′ W	2 ii	0844	144	WSW	22	WSW	6	o. q.	982·4	3·3	2·4	heavy SW swell
329	54° 26½′ S, 38° 06′ W (same position as St. 327)	2 ii	1509	—	WSW	21	SW × W	6	c. q.	987·8	2·5	1·8	v. heavy SW swell
330	54° 33′ S, 38° 29′ W (same position as St. 326)	2 ii	1740	—	WSW	16	WSW	6	c.	990·2	3·0	1·6	heavy SW swell
331	54° 40′ S, 38° 52½′ W	2 ii	1950	218 gn. M.	W × S	13	WSW	4	c.	990·4	3·0	1·7	heavy WSW swell
332	54° 44½′ S, 39° 09′ W	2–3 ii	2249 2330	262 249 gn. M.	N	7	WSW	2	o.	990·8	3·0	2·5	mod. WSW swell
			0515	—	NW × W	14	NW	4	o. f. e.	991·9	3·5	3·5	mod. W swell
333	54° 48½′ S, 39° 24½′ W	3 ii	0650	262 R. sm. St.	NW × W	17	NW	4	o.	993·2	3·5	3·5	heavy NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
326 *cont.*	3	60	3·29	33·86	26·97	8·11	89	4·28					
		80	1·55	33·91	27·15	8·06	112						
		100	0·70	33·95	27·24	8·00	133	6·17					
		150	0·52	34·05	27·33	7·92	139						
		200	0·90	34·20	27·43	7·87	139	4·51					
327	3	0	3·25	33·85	26·97	8·13	84	—	**N 50 V**	100–0	0545		
		10	3·25	33·85	26·97	8·13	83	—	**N 70 V**	50–0			
		20	3·25	33·84	26·96	8·12	75	—	,,	100–50			
		30	3·22	33·84	26·96	8·12	79	—	,,	200–100	—	0707	
		40	3·22	33·84	26·96	8·13	78	—	**N 70 B**	53–0	0715	0735	KT. N 100 B repeated on St. 329
		50	3·22	33·85	26·97	8·11	75	—	**N 100 B**				
		60	3·22	33·85	26·97	8·12	84						
		80	3·22	33·88	27·08	8·08	131						
		100	1·32	33·95	27·20	8·03	116						
		150	0·55	33·98	27·28	7·94	120						
		200	0·68	34·13	27·39	7·87	128						
328	3	0	3·20	33·69	26·84	8·14	87	7·50	**N 50 V**	100–0	0855		
		10	3·18	33·70	26·85	8·14	87	7·55	**N 70 V**	50–0			
		20	3·02	33·78	26·93	8·14	88	6·61	,,	100–50	—	0940	
		30	2·95	33·78	26·93	8·13	87	—	**N 100 B**	71–0	1008	1023	KT
		40	2·10	33·87	27·08	8·10	101	6·49	**N 70 B**	122–0	1029	1044	KT
		50	1·90	33·87	27·10	8·08	102						
		60	1·85	33·90	27·12	8·06	96	6·38					
		80	1·35	33·95	27·20	8·04	102						
		100	1·05	33·96	27·23	7·99	124	6·23					
		135	0·80	34·04	27·31	7·93	121	5·89					
329	4	—	—	—	—	—	—	—	**N 100 B**	173–0	1525	1544	KT
330	4	—	—	—	—	—	—	—	**N 100 B**	182–0	1750	1810	KT
331	4	0	3·35	33·87	26·98	8·14	78	—	**N 50 V**	100–0	2000		
		10	3·35	33·87	26·98	8·13	87	—	**N 70 V**	50–0			
		20	3·35	33·87	26·98	8·13	87	—	,,	100–50			
		30	3·35	33·87	26·98	8·11	87	—	,,	200–100	—	2025	
		40	3·30	33·87	26·98	8·11	93	—	**N 70 B**	176–0	**2132**	**2152**	KT
		50	3·22	33·87	26·98	8·08	102	—	**N 100 B**				
		60	2·95	33·88	27·02	8·07	97						
		80	1·12	33·96	27·22	8·04	111						
		100	0·50	33·97	27·27	8·00	128						
		150	0·45	34·08	27·36	7·91	135						
		200	0·90	34·22	27·44	7·84	135						
332	4	0	3·00	33·89	27·02	8·11	88	—	**N 50 V**	100–0	**2300**		
		10	3·00	33·89	27·02	8·12	109	6·97	**N 70 V**	50–0			
		20	3·00	33·89	27·02	8·12	90	6·91	,,	100–50			
		30	3·00	33·89	27·02	8·10	108	—	,,	250–100	—	**2330**	
		40	3·00	33·89	27·02	8·10	88	6·92	**N 70 B**	182–0	0500	0520	KT
		50	2·95	33·89	27·02	8·07	91	—	**N 100 B**				
		60	2·45	33·89	27·07	8·07	96	7·14					
		80	0·45	33·99	27·29	8·02	122						
		100	0·52	34·06	27·34	7·97	130	6·96					
		150	1·33	34·22	27·42	7·90	128						
		200	1·58	34·26	27·43	7·89	146	6·67					
		250	1·50	34·34	27·50	7·86	149	5·17					
333	4	0	3·00	33·89	27·02	8·14	90	—	**N 50 V**	100–0	0700		
		10	3·00	33·92	27·05	8·12	101	—	**N 70 V**	50–0			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
333 *cont.*	54° 48½′ S, 39° 24½′ W	1930 3 ii											
334	55° 43′ S, 36° 51′ W	4 ii	1700	3250 M. S. sm. St.	WSW	16	WSW	4	o.	1000·0	3·1	2·7	heavy W swell
			2041	—	W	17	W	4	o.	1000·7	3·0	2·5	,,
335	55° 33′ S, 36° 49½′ W to 55° 31½′ S, 36° 49½′ W	4–5 ii	2241	3416 M. S.	W × S	18	W S	4	c.	1003·0	1·8	2·4	heavy W swell
			0344	—	W	10	W	2	o.	1004·2	1·5	1·5	mod. W swell
336	55° 21½′ S, 36° 48½′ W to 55° 20′ S, 36° 48½′ W	5 ii	0444	3193 S. Di.	N	7	W	3	o.	1005·3	1·6	1·1	heavy W swell
			1116		E	14	E	2	o.	1004·5	2·0	1·5	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
333 *cont.*	4	20	3·00	33·92	27·05	8·11	102	—	**N 70 V**	100–50			
		30	3·00	33·90	27·03	8·11	90	—	,,	250–100	—	0730	
		40	2·98	33·90	27·03	8·10	95	—	**N 70 B**	155–0	0811	0825	KT
		50	2·96	33·90	27·03	8·08	92	—	**N 100 B**				
		60	1·58	33·92	27·16	8·06	104						
		80	0·40	33·98	27·28	8·02	124						
		100	−0·10	34·05	27·37	7·97	138						
		150	0·80	34·18	27·42	7·89	149						
		200	1·60	34·38	27·53	7·85	148						
		250	1·86	34·47	27·58	7·84	148						
334	6	0	3·01	33·89	27·02	8·11	77	—	**N 50 V**	100–0	1725		
		10	3·01	33·89	27·02	8·11	82	—	**N 70 V**	50–0			
		20	3·01	33·89	27·02	8·12	88	—	,,	100–50			
		30	2·90	33·89	27·03	8·12	90	—	,,	250–100			
		40	2·58	33·89	27·06	8·10	86	—	,,	500–250			
		50	2·36	33·89	27·08	8·08	100	—	,,	750–500			
		60	1·80	33·93	27·15	8·05	101	—	,,	1000–750	—	1938	
		80	0·58	33·99	27·27	8·00	112	—	**N 70 B**	110–0	2025	2045	KT
		100	0·48	34·05	27·34	7·96	120	—	**N 100 B**				
		150	0·70	34·11	27·37	7·93	124						
		200	0·99	34·22	27·44	7·91	127						
		300	1·84	34·40	27·52	7·86	137						
		400	1·85	34·47	27·58	7·87	137						
		600	2·09	34·61	27·67	7·86	135						
		800	2·00	34·69	27·75	7·89	140						
		1000	1·89	34·71	27·77	7·91	130						
		1500	1·54	34·73	27·81	7·95	133						
		2000	1·07	34·71	27·83	7·96	132						
		2500	0·67	34·71	27·85	7·95	132						
335	6	0	2·80	33·82	26·98	8·13	69	7·15	**N 50 V**	100–0	**2203**		
		10	2·82	33·82	26·98	8·12	72	7·17	**N 70 V**	50–0			
		20	2·80	33·82	26·98	8·13	74	6·81	,,	100–50			
		30	2·75	33·82	26·99	8·13	72	—	,,	250–100			
		40	2·75	33·82	26·99	8·12	81	6·09	,,	500–250			
		50	2·66	33·83	27·00	8·10	82	—	,,	750–500			
		60	2·02	33·85	27·07	8·07	82	6·86	,,	1000–0	—	**0315**	
		80	0·62	33·94	27·24	8·02	109	—	**N 70 B**	121–0	**0329**	**0349**	KT
		100	0·39	34·03	27·32	7·97	115	6·23	**N 100 B**				
		150	0·65	34·13	27·39	7·93	121						
		200	1·26	34·25	27·45	7·87	130	4·97					
		300	1·80	34·40	27·53	7·90	141						
		400	2·09	34·53	27·61	7·83	145	4·14					
		600	2·09	34·62	27·68	7·88	123	3·36					
		800	2·07	34·68	27·73	7·92	130	3·45					
		1000	1·72										
		1500	1·56	34·73	27·81	7·93	121	3·67					
		2000	1·02	34·72	27·84	7·93	137	4·19					
		2500	0·66	34·70	27·85	7·93	137	4·31					
		3000	0·44	34·69	27·85	7·98	133	4·32					
336	6	0	2·80	33·83	26·99	8·12	83	—	**N 50 V**	100–0	0510		
		10	2·80	33·83	26·99	8·11	83	—	**N 70 V**	50–0			
		20	2·82	33·83	26·99	8·12	84	—	,,	100–50			
		30	2·80	33·82	26·98	8·12	83	—	,,	250–100			
		40	2·80	33·84	27·00	8·11	82	—	,,	500–250			
		50	2·49	33·86	27·04	8·10	82	—	,,	750–500	—	1040	
		60	1·87	33·94	27·15	8·06	86	—	**N 70 B**	128–0	1055	1115	KT
		80	0·68	33·98	27·27	8·01	93	—	**N 100 B**				
		100	0·32	34·04	27·33	7·98	120						
		150	0·80	34·16	27·40	7·93	120						

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
336 *cont.*	55° 21½′ S, 36° 48½′ W to 55° 20′ S, 36° 48½′ W	1930 5 ii											
337	55° 09′ S, 36° 48′ W	5 ii	1216	1812 di. Oz.	ESE	14	E	2	b.	1004·2	3·5	2·7	mod. SW swell
			1514	—	ESE	12	ESE	3	b. c. v.	1003·1	3·7	2·7	mod. W swell
338	55° 00½′ S, 36° 46′ W	5 ii	1604	245 sm. St. bk. S. M.	S	5	—	0–1	c. v.	1002·6	4·0	3·5	mod. W swell
339	54° 51½′ S, 36° 44½′ W	5 ii	1813	269 gy. M.	SE	3	—	0	c.	1001·4	4·2	3·5	mod. conf. swell
340	54° 36′ S, 36° 40½′ W	5 ii	2120	145 gn. M.	S	3	—	0	o.	998·8	5·1	3·9	mod. conf. swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
336 *cont.*	6	200	1·38	34·29	27·47	7·86	130						
		300	1·82	34·39	27·52	7·84	137						
		400	1·92	34·48	27·58	7·83	135						
		600	1·99	34·61	27·68	7·85	125						
		800	1·95	34·70	27·76	7·89	126						
		1000	1·85	34·71	27·77	7·89	126						
		1500	1·40	34·72	27·81	7·93	128						
		2000	0·91	34·72	27·85	7·93	128						
		2500	0·56	34·70	27·85	7·94	133						
		3000	0·37	34·69	27·85	7·95	130						
337	7	0	2·95	33·88	27·02	8·11	83	—	**N 50 V**	100–0	1223		
		10	2·70	33·88	27·04	8·12	93	6·59	**N 70 V**	50–0			
		20	2·68	33·89	27·05	8·11	81	6·80	,,	100–50			
		30	2·64	33·88	27·04	8·11	79	—	,,	250–100			
		40	2·60	33·89	27·05	8·11	85	6·69	,,	500–250			
		50	2·50	33·89	27·06	8·10	89	—	,,	750–500			
		60	2·39	33·88	27·06	8·09	75	6·60	,,	1000–750	—	1440	
		80	1·30	33·91	27·17	8·09	99	—	**N 70 B**	100–0	1454	1516	KT
		100	0·56	33·95	27·25	8·03	118	6·55	**N 100 B**				
		150	0·41	34·11	27·39	7·96	121						
		200	1·27	34·27	27·46	7·92	139	4·94					
		300	1·90	34·45	27·56	7·85	142						
		400	1·94	34·53	27·62	7·85	145	3·85					
		600	1·98	34·61	27·68	7·92	134	3·78					
		800	1·97	34·70	27·76	7·92	136	3·81					
		1000	1·82	34·72	27·78	7·92	133	3·83					
		1500	1·27	34·72	27·82	7·95	130	4·03					
		1700	1·15	—	—	7·97	128	4·02					
338	7	0	3·56	33·86	26·94	8·13	78	—	**N 50 V**	100–0	1614		
		10	3·21	33·86	26·98	8·12	75	—	**N 70 V**	50–0			
		20	3·10	33·86	26·99	8·13	81	—	,,	100–50			
		30	3·10	33·86	26·99	8·13	74	—	,,	225–100	—	1646	
		40	3·00	33·86	27·00	8·10	91	—	**N 70 B**	86–0	1715	1735	KT
		50	2·72	33·86	27·02	8·10	79	—	**N 100 B**				
		60	2·48	33·87	27·05	8·09	91						
		80	1·28	33·91	27·17	8·08	124						
		100	0·92	34·00	27·26	7·99	124						
		150	0·60	34·05	27·33	7·92	121						
		200	0·88	34·20	27·43	7·86	123						
		230	1·20	34·27	27·47	7·86	125						
339	7	0	4·08	33·84	26·88	8·12	66	6·43	**N 50 V**	100–0	1815		
		10	3·40	33·83	26·94	8·13	74	6·98	**N 70 V**	50–0			
		20	3·35	33·84	26·95	8·13	78	7·09	,,	100–50			
		30	3·32	33·85	26·96	8·12	80	—	,,	250–100	—	1900	
		40	3·02	33·86	27·00	8·11	86	6·90	**N 70 B**	119–0	1929	1949	KT
		50	2·92	33·86	27·00	8·09	84	—	**N 100 B**				
		60	2·80	33·87	27·02	8·08	81						
		80	1·86	33·89	27·12	8·06	96						
		100	1·30	33·96	27·21	8·04	98	6·03					
		150	0·78	34·02	27·29	7·92	118						
		200	0·83	34·18	27·42	7·87	130	5·48					
		250	1·20	34·27	27·47	7·84	130	4·85					
340	7	0	4·30	33·77	26·80	8·14	71	7·44	**N 50 V**	100–0	**2130**		
		10	3·72	33·77	26·86	8·14	73	6·49	**N 70 V**	50–0			
		20	3·55	33·79	26·89	8·13	74	6·46	,,	100–50	—	**2210**	
		30	3·32	33·82	26·94	8·13	86	—	**N 70 B**	106–0	**2224**	**2244**	KT
		40	3·15	33·83	26·96	8·12	81	6·40	**N 100 B**				
		50	3·08	33·82	26·96	8·11	79						

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
340 *cont.*	54° 36′ S, 36° 40½′ W	1930 5 ii											
341	54° 43′ S, 36° 42½′ W	5–6 ii	2330	252 gn. M.	W	6	—	0	o.	995·5	4·5	3·5	mod. conf. swell
342	55° 47′ S, 34° 11′ W	7 ii	1205	3599	NE	16	NE	4	c. m.	966·7	3·6	3·5	heavy N swell
			1545	—	ENE	3	—	0	o. f.	966·1	3·3	3·2	heavy NE swell
343	55° 40′ S, 34° 23′ W	7 ii	1718	960 sm. St.	W	9	W	1	o. m.	967·0	2·8	2·7	heavy N swell
			2022	—	W	8	W	2	o. f.	966·8	2·8	2·8	,,
344	55° 33′ S, 34° 35½′ W to 55° 29½′ S, 34° 32′ W	7–8 ii	2118	1913 sm. St. S.	W S	18	W S	4	o. d.	970·0	2·8	2·8	heavy N swell
			0145	—	SW · W	27	WSW	6	o. e.	973·5	2·5	2·5	heavy conf. N swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
340 *cont.*	7	60	2·84	33·83	26·99	8·11	86	6·26					
		80	2·14	33·86	27·07	8·10	105						
		100	1·25	33·93	27·19	8·02	115	6·06					
		130	1·06	33·95	27·22	7·96	126	6·03					
341	7	0	3·95	33·82	26·87	8·13	89	—	**N 50 V**	100–0	**2340**		
		10	3·38	33·82	26·93	8·13	86	—	**N 70 V**	50–0			
		20	3·38	33·84	26·95	8·12	85	—	,,	100–50			
		30	3·30	33·84	26·95	8·13	85	—	,,	230–100	—	**0013**	
		40	3·10	33·84	26·97	8·11	80	—	**N 70 B**	111–0	**0050**	**0110**	KT
		50	2·80	33·84	27·00	8·10	83	—	**N 100 B**				
		60	2·70	33·84	27·01	8·09	89						
		80	1·72	33·92	27·15	8·07	116						
		100	1·05	33·94	27·21	8·02	121						
		150	0·66	34·04	27·32	7·92	124						
		200	0·88	34·19	27·42	7·88	129						
		240	1·01	34·23	27·45	7·84	136						
342	9	0	2·30	33·82	27·03	8·10	73	—	**N 50 V**	100–0	1210		
		10	2·25	33·82	27·03	8·10	91	—	**N 70 V**	50–0			
		20	2·18	33·82	27·03	8·10	90	—	,,	100–50			
		30	2·16	33·82	27·04	8·10	81	—	,,	250–100			
		40	2·14	33·83	27·05	8·10	84	—	,,	500–250			
		50	2·05	33·84	27·06	8·10	84	—	,,	750–500	—	1505	
		60	1·08	33·84	27·13	8·06	108	—	**N 70 B**	173–0	1524	1544	KT
		80	0·32	33·95	27·26	8·00	120	—	**N 100 B**				
		100	0·01	34·03	27·34	7·94	125						
		150	0·95	34·29	27·50	7·85	128						
		200	1·48	34·41	27·56	7·82	128						
		300	1·85	34·55	27·65	7·82	128						
		400	1·85	34·62	27·70	7·83	125						
		600	1·87	34·67	27·74	7·86	125						
		800	1·69	34·68	27·76	7·87	126						
		1000	1·53	34·71	27·80	7·87	132						
		1500	1·06	34·73	27·85	7·90	137						
		2000	0·58	34·71	27·86	7·92	128						
		2500	0·41	34·69	27·85	7·93	134						
		3000	0·22	34·69	27·86	7·92	130						
		3400	0·15	34·68	27·86	7·94	130						
343	9	0	2·45	33·84	27·03	8·14	79	5·34	**N 50 V**	100–0	1724		
		10	2·30	33·84	27·04	8·13	78	5·54	**N 70 V**	50–0			
		20	2·28	33·83	27·04	8·13	84	6·99	,,	100–50			
		30	2·20	33·83	27·04	8·13	86	—	,,	250–100			
		40	2·14	33·83	27·05	8·12	89	6·90	,,	500–250	—	1850	
		50	1·85	33·83	27·07	8·12	89	—	**N 70 B**	51–0	1956	2016	KT
		60	1·25	33·88	27·15	8·10	89	6·62	**N 100 B**				
		80	0·54	33·94	27·24	8·04	108						
		100	0·28	34·01	27·31	7·99	111	6·20					
		150	0·35	34·15	27·42	7·92	125						
		200	1·45	34·42	27·57	7·86	136	4·25					
		300	1·74	34·56	27·66	7·83	133						
		400	2·01	34·61	27·69	7·88	132	3·62					
		600	1·95	34·68	27·74	7·87	124	4·02					
		800	1·82	34·70	27·77	7·88	130	3·47					
		900	1·72	34·70	27·78	7·90	126	3·93					
344	9	0	2·45	33·80	27·00	8·13	93	—	**N 50 V**	100–0	**2135**		
		10	2·40	33·81	27·01	8·13	84	—	**N 70 V**	50–0			
		20	2·25	33·82	27·03	8·12	75	—	,,	100–50			
		30	2·22	33·82	27·03	8·11	75	—	,,	250–100			
		40	2·18	33·81	27·03	8·11	79	—	,,	500–250			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
344 *cont.*	55° 33′ S, 34° 35½′ W to 55° 29½′ S, 34° 32′ W	1930 7–8 ii											
345	55° 20′ S, 34° 47½′ W	8 ii	1152	218 sm. St. Sh.	SSW	28	SSW	6	c. q.	992·2	1·5	1·0	v. heavy SW swell
346	55° 14′ S, 35° 02′ W	8 ii	1418	152 St.	SW × S	20	SW	4	o. r. s.	996·2	1·4	0·8	heavy SW swell
347	55° 08′ S, 35° 14½′ W	8 ii	1618	139 c. bk. S. sm. St.	SW	20	SW	4	c. q.	997·3	2·0	1·1	heavy SW swell
348	54° 53½′ S, 35° 41½′ W	8 ii	2015	99 sm. St.	WSW	25	WSW	5	b. c.	999·9	2·5	1·7	heavy WSW swell
349	55° 01′ S, 35° 27½′ W	8 ii	2221	133 bk. S.	WSW	20	WSW	5	c.	1000·5	2·4	1·7	heavy SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
344 *cont.*	9	50	2·15	33·81	27·03	8·10	76	—	N 70 V	750–500			
		60	2·00	33·81	27·04	8·10	84	—	,,	1000–750	—	**2350**	
		80	0·61	33·93	27·23	8·02	88	—	N 70 B	159–0	**0125**	**0146**	KT
		100	0·10	33·96	27·28	7·98	111	—	N 100 B				
		150	0·20	34·15	27·43	7·91	111						
		200	1·12	34·30	27·49	7·84	113						
		300	1·84	34·51	27·61	7·83	114						
		400	2·00	34·56	27·64	7·83	120						
		600	2·00	34·62	27·69	7·86	118						
		800	1·92	34·68	27·74	7·86	118						
		1000	1·80	34·69	27·76	7·88	116						
		1500	1·49	34·70	27·79	7·88	116						
		1800	1·19	34·70	27·82	7·89	120						
345	10	0	2·88	33·84	26·99	8·13	75	6·95	N 50 V	100–0	1155		
		10	2·88	33·85	27·00	8·13	81	6·92	N 70 V	50–0			
		20	2·88	33·86	27·01	8·12	76	6·86	,,	100–50			
		30	2·78	33·86	27·02	8·11	78	—	,,	180–100	—	1257	Net touched bottom
		40	2·50	33·86	27·04	8·11	79	6·60	N 70 B	106–0	1310	1330	KT
		50	2·25	33·92	27·11	8·10	83	—	N 100 B				
		60	1·37	33·93	27·18	8·08	85	6·55					
		80	0·32	34·04	27·33	7·96	106						
		100	0·38	34·10	27·38	7·91	115	6·32					
		150	0·99	34·25	27·46	7·84	114						
		200	1·11	34·31	27·50	7·88	103						
346	10	0	2·78	33·84	27·00	8·14	78	—	N 50 V	100–0	1427		
		10	2·78	33·84	27·00	8·13	78	—	N 70 V	50–0			
		20	2·75	33·84	27·00	8·13	78	—	,,	100–50	—	1450	
		30	2·75	33·85	27·01	8·12	83	—	N 70 B	73–0	1508	1526	KT
		40	2·75	33·85	27·01	8·11	73	—	N 100 B				
		50	2·72	33·85	27·01	8·11	75						
		60	2·70	33·86	27·02	8·11	79						
		80	1·85	33·87	27·10	8·07	80						
		100	0·81	34·00	27·28	7·98	108						
		140	0·69	34·05	27·32	7·93	116						
347	10	0	3·08	33·74	26·89	8·13	75	6·89	N 50 V	100–0	1635		
		10	3·08	33·75	26·90	8·13	75	6·88	N 70 V	50–0			
		20	3·08	33·76	26·91	8·13	70	6·37	,,	100–50	—	1705	
		30	3·08	33·76	26·91	8·11	69	—	N 70 B	100–0	1757	1817	KT
		40	3·08	33·78	26·93	8·11	66	5·68	N 100 B				
		50	3·04	33·78	26·93	8·11	88						
		60	3·02	33·78	26·93	8·10	68	5·83					
		80	2·50	33·82	27·01	8·08	69						
		100	2·39	33·84	27·03	8·07	73	6·12					
348	10	0	3·11	33·71	26·87	8·11	60	—	N 50 V	85–0	2024		
		10	3·11	33·71	26·87	8·11	59	6·32	N 70 V	50–0			
		20	3·11	33·71	26·87	8·11	66	6·43	,,	90–50	—	2047	
		30	3·11	33·71	26·87	8·11	61	—	N 70 B	47–0	**2108**	**2118**	KT
		40	3·11	33·71	26·87	8·11	65	6·30	N 100 B				
		50	3·11	33·69	26·85	8·09	81						
		60	3·08	33·70	26·86	8·09	73	5·99					
		80	2·28	33·84	27·04	8·06	74	5·80					
349	10	0	3·00	33·82	26·97	8·13	66	—	N 50 V	100–0	**2237**		
		10	3·01	33·82	26·97	8·13	66	—	N 70 V	50–0			
		20	3·01	33·82	26·97	8·13	73	—	,,	100–50	—	**2255**	
		30	3·00	33·80	26·95	8·11	73	—	N 70 B	60–0	**2321**	**2338**	KT
		40	2·96	33·80	26·95	8·11	73	—	N 100 B				
		50	2·70	33·84	27·01	8·11	79						

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
349 *cont.*	55° 01′ S, 35° 27½′ W	1930 8 ii											
350	54° 23′ S, 36° 00′ W	9 ii	0455	139 gy. M.	NW × N	8	—	1	c.	1000·3	3·5	2·7	mod. N swell
351	54° 21½′ S, 35° 42′ W	9 ii	0725	221 gn. M.	NW	19	NW	5	o.	999·6	2·8	2·2	mod. conf. N swell
352	54° 19′ S, 35° 24′ W	9 ii	0940	207 gy. M. bk. Sp. sm. St.	NW	20	NW	5	o.	999·5	2·8	2·2	mod. NW swell
353	54° 17½′ S, 35° 06′ W	9 ii	1211	1167 sm. St	NW	18	NW	4	o.	998·9	3·0	2·5	heavy WNW swell
354	54° 15½′ S, 34° 47½′ W to 54° 13¼′ S, 34° 46′ W	9 ii	1543	3979	NW × N	22	NW	4	o.	998·0	2·5	2·5	heavy WNW swell
			2002	—	NW × N	18	NW	4	c.	996·9	2·7	2·5	heavy NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
349 *cont.*	10	60	2·40	33·85	27·04	8·10	79						
		80	2·24	33·87	27·07	8·10	79						
		100	2·18	33·87	27·08	8·06	79						
		120	2·00	33·93	27·14	8·04	99						
350	10	0	4·07	33·57	26·66	8·12	65	6·37	**N 50 V**	100–0	0500		
		10	3·88	33·66	26·75	8·12	73	7·01	**N 70 V**	50–0			
		20	3·62	33·71	26·82	8·12	73	7·02	,,	100–50	—	0534	
		30	3·22	33·84	26·96	8·11	75	—	**N 70 B**	113–0	0553	0607	KT
		40	2·87	33·84	26·99	8·11	73	6·73	**N 100 B**				
		50	2·49	33·86	27·04	8·11	81						
		60	2·28	33·89	27·08	8·10	85	6·86					
		80	2·13	33·91	27·11	8·09	101						
		100	1·28	33·95	27·20	8·03	113	6·49					
		135	0·90	34·02	27·29	7·98	119	6·20					
351	10	0	3·78	33·69	26·79	8·13	85	—	**N 50 V**	100–0	0735		
		10	3·72	33·69	26·80	8·13	88	—	**N 70 V**	50–0			
		20	3·58	33·75	26·86	8·12	85	—	,,	100–50			
		30	3·52	33·76	26·87	8·12	88	—	,,	210–100	—	0800	
		40	3·42	33·78	26·90	8·11	84	—	**N 70 B**	48–0	0826	0845	KT
		50	3·25	33·84	26·96	8·09	75	—	**N 100 B**				
		60	2·72	33·86	27·02	8·09	93						
		80	1·95	33·90	27·12	8·08	91						
		100	0·95	33·96	27·23	8·03	105						
		150	0·45	34·05	27·34	7·96	130						
		200	0·85	34·14	27·39	7·89	134						
352	10	0	2·95	33·87	27·01	8·10	86	6·59	**N 50 V**	100–0	0953		
		10	2·94	33·87	27·01	8·10	93	6·88	**N 70 V**	50–0			
		20	2·92	33·87	27·01	8·10	84	6·83	,,	100–50			
		30	2·90	33·87	27·01	8·09	91	—	,,	190–100	—	1026	
		40	2·85	33·87	27·02	8·10	94	6·66	**N 70 B**	58–0	1100	1119	KT
		50	2·80	33·87	27·03	8·09	94	—	**N 100 B**				
		60	2·70	33·87	27·03	8·09	95	6·66					
		80	1·90	33·89	27·11	8·06	96						
		100	1·45	33·93	27·18	8·04	105	7·09					
		150	0·61	34·04	27·32	7·95	119						
		190	0·65	34·09	27·36	7·93	132	5·77					
353	11	0	2·38	33·87	27·06	8·10	94	—	**N 50 V**	100–0	1216		
		10	2·40	33·87	27·06	8·10	94	—	**N 70 V**	50–0			
		20	2·38	33·88	27·06	8·10	93	—	,,	100–50			
		30	2·38	33·88	27·07	8·10	91	—	,,	250–100			
		40	2·38	33·88	27·07	8·09	90	—	,,	500–250			
		50	2·38	33·89	27·07	8·09	94	—	,,	750–500			
		60	2·35	33·88	27·07	8·08	98	—	,,	1000–750	—	1405	
		80	1·55	33·97	27·20	8·06	99	—	**N 70 B**	89–0	1425	1445	KT
		100	0·64	34·05	27·33	7·98	129	—	**N 100 B**				
		150	0·58	34·12	27·38	7·91	140						
		200	0·90	34·22	27·45	7·91	142						
		300	1·64	34·40	27·54	7·86	144						
		400	1·90	34·50	27·60	7·86	133						
		600	2·01	34·64	27·70	7·87	142						
		800	1·93	—	—	7·89	126						
		1000	1·78	34·69	27·76	7·89	129						
354	11	0	2·35	33·87	27·06	8·10	78	6·86	**N 50 V**	100–0	1548		
		10	2·35	33·87	27·06	8·10	81	6·83	**N 70 V**	50–0			
		20	2·32	33·87	27·06	8·11	75	6·69	,,	100–50			
		30	2·31	33·87	27·07	8·10	70	—	,,	250–100			
		40	2·30	33·87	27·07	8·10	60	5·45	,,	500–250			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
354 *cont.*	54° 15½′ S, 34° 47½′ W to 54° 13¼′ S, 34° 46′ W	1930 9 ii											
355	54° 13½′ S, 34° 18½′ W to 54° 10½′ S, 34° 16½′ W	9–10 ii	2130	3714 di. Oz. bk. Sp.	NW · N	20	NW · N	4	o.	996·9	2·7	2·6	mod. NW swell
			0430	—	NW	12	NW	2	o. m.	996·7	2·6	2·6	slight NW swell
356	54° 11′ S, 33° 49′ W to 54° 08¾′ S, 33° 47½′ W	10 ii	0600	3272 di. Oz.	NNW	12	NNW	2	o. m. d.	995·7	2·2	2·2	slight NW swell
			0943	—	NW	26	NW	6	o. e.	994·6	2·0	2·0	mod. NW swell
357	53° 07′ S, 34° 48′ W to 53° 07½′ S, 34° 45½′ W	10 ii	1830	3645 di. Oz.	NW	28	NW	6	o. m. d. p.	988·5	4·5	4·5	heavy NW swell
			2245	—	NW	25	NW	5	o. d.	986·5	4·0	4·0	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
354 *cont.*	11	50	2·22	33·88	27·08	8·10	83	—	**N 70 V**	750–500			
		60	1·71	33·91	27·14	8·08	115	—	,,	1000–750	—	1800	
		80	0·69	34·02	27·30	8·01	123	—	**N 70 B**	96–0	1940	2000	KT
		100	0·28	34·05	27·35	7·95	114	6·20	**N 100 B**				
		150	0·95	34·23	27·45	7·91	114						
		200	1·54	34·38	27·53	7·86	116	4·77					
		300	1·94	34·49	27·59	7·82	121						
		400	1·98	34·61	27·68	7·84	137	3·76					
		600	1·97	34·66	27·72	7·85	123	3·93					
		800	1·85	34·69	27·76	7·89	118	3·86					
		1000	1·69	34·70	27·78	7·90	106	4·21					
		1500	1·41	34·72	27·81	7·95	99	4·11					
		2000	1·01	34·73	27·85	7·93	115	4·22					
		2500	0·59	34·70	27·85	7·98	99	4·45					
		3000	0·43	34·69	27·85	7·95	98	4·65					
		3500	0·21	34·69	27·86	8·01	113	4·48					
355	11	0	2·01	33·86	27·08	8·12	53	—	**N 50 V**	100–0	**2118**		
		10	2·02	33·86	27·08	8·12	53	—	**N 70 V**	50–0			
		20	2·00	33·87	27·09	8·12	53	—	,,	100–50			
		30	2·00	33·87	27·09	8·11	53	—	,,	250–100			
		40	2·00	33·87	27·09	8·11	44	—	,,	500–250			
		50	1·92	33·87	27·10	8·11	75	—	,,	750–500			
		60	1·02	33·91	27·19	8·09	60	—	,,	1000–750	—	**2340**	
		80	0·11	33·98	27·30	8·02	106	—	**N 70 B**	110–0	**0410**	0430	KT
		100	0·00	34·07	27·38	7·95	116	—	**N 100 B**				
		150	1·08	34·30	27·50	7·86	125						
		200	1·61	34·40	27·54	7·84	119						
		300	1·92	34·56	27·65	7·82	120						
		400	1·94	34·62	27·70	7·82	120						
		600	1·88	34·66	27·73	7·87	123						
		800	1·68	34·67	27·75	7·87	123						
		1000	1·47	34·69	27·78	7·91	108						
		1500	1·05	34·71	27·83	7·91	130						
		2000	0·59	34·72	27·87	7·92	108						
		2500	0·38	34·70	27·86	7·94	123						
		3000	0·36	34·69	27·86	7·93	121						
356	11	0	2·02	33·87	27·09	8·12	65	7·15	**N 50 V**	100–0	0610		
		10	2·02	33·87	27·09	8·12	54	7·12	**N 70 V**	50–0			
		20	1·98	33·87	27·09	8·12	53	7·19	,,	100–50			
		30	1·98	33·87	27·09	8·11	54	—	,,	250–100			
		40	1·92	33·87	27·10	8·12	69	7·18	,,	500–250			
		50	1·10	33·95	27·16	8·08	80	—	,,	750–500			
		60	0·55	33·97	27·27	8·03	100	6·62	,,	1000–750	—	0743	
		80	0·12	34·05	27·35	7·95	96	—	**N 70 B**	200–0	0922	0947	
		100	−0·02	34·12	27·42	7·94	101	6·16	**N 100 B**				
		150	0·88	34·40	27·59	7·85	116						
		200	1·30	34·43	27·59	7·83	106	4·19					
		300	1·98	34·59	27·67	7·82	114						
		400	1·92	34·64	27·71	7·82	119	4·005					
		600	1·74	34·68	27·76	7·86	115	4·03					
		800	1·58	—	—	7·87	114	4·02					
		1000	1·37	34·70	27·80	7·89	119	4·31					
		1500	0·84	34·71	27·84	7·89	116	4·64					
		2000	0·55	34·72	27·87	7·90	104	4·45					
		2500	0·29	34·69	27·86	7·90	116	4·68					
		3000	0·18	34·68	27·86	7·93	109	4·68					
357	12	0	3·15	33·81	26·95	8·11	53	—	**N 50 V**	100–0	1835		
		10	3·15	33·83	26·96	8·11	53	—	**N 70 V**	50–0			
		20	3·48	33·83	26·93	8·11	53	—	,,	100–50			

5

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
357 *cont.*	53° 07′ S, 34° 48′ W to 53° 07½′ S, 34° 45½′ W	1930 10 ii											
358	53° 16½′ S, 35° 02½′ W to 53° 17′ S, 34° 58′ W	11 ii	0100	3539 di. Oz.	WNW	28	WNW	5	o. m. q.	985·6	3·0	2·8	heavy WNW swell
			0537	—	WNW	27	WNW	5	c. m.	983·1	4·0	3·4	,,
359	55° 07′ S, 32° 12′ W	24 ii	1000	—	SW	24	SW	4	o. s. l.	1003·2	1·0	1·0	mod. conf. SW swell
			1345	—	SW × W	22	conf.	4	o. p. s.	1005·7	0·5	0·5	,,
360	55° 53′ S, 32° 33′ W to 55° 50′ S, 32° 26½′ W	24–25 ii	2002	3264 di. Oz. S.	SW	17	SW	4	o. s.	1008·8	0·0	0·0	mod. conf. SW swell
			0045	—	SW	14	SW	4	o. p. s.	1010·9	0·0	0·0	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
357 *cont.*	12	30	3·40	33·84	26·95	8·11	53	—	N 70 V	250–100			
		40	3·10	33·84	26·97	8·11	53	—	,,	500–250			
		50	2·99	33·85	26·99	8·09	70	—	,,	750–500	—	2217	
		60	2·70	33·85	27·02	8·09	70	—	N 70 B	193–0	2226	2246	KT
		80	0·80	33·91	27·20	8·03	116	—	N 100 B				
		100	0·11	33·96	27·28	7·97	116						
		150	0·68	34·16	27·41	7·89	118						
		200	1·40	34·38	27·54	7·81	120						
		300	1·84	34·50	27·60	7·81	129						
		400	1·90	34·59	27·67	7·81	121						
		600	1·92	34·64	27·71	7·84	125						
		800	1·81	34·68	27·75	7·86	123						
		1000	1·66	34·69	27·77	7·86	116						
		1500	1·14	34·70	27·82	7·88	125						
		2000	0·77	34·72	27·86	7·89	125						
		2500	0·45	34·69	27·85	7·92	115						
		3000	0·22	34·68	27·86	7·92	129						
358	12	0	3·63	33·80	26·89	8·11	60	6·95	N 50 V	100–0	0113		
		10	3·62	33·81	26·90	8·11	60	6·85	N 70 V	50–0			
		20	3·65	33·83	26·91	8·11	60	6·90	,,	100–50			
		30	3·60	33·83	26·92	8·11	65	—	,,	250–100			
		40	3·60	33·83	26·92	8·11	66	6·88	,,	500–250			
		50	2·55	33·86	27·04	8·10	68	—	,,	750–500			
		60	1·52	33·87	27·12	8·07	98	6·89	,,	1000–750	—	0357	
		80	0·58	33·92	27·22	8·00	94	—	N 70 B	155–0	0526	0543	KT
		100	0·40	33·97	27·28	7·95	94	6·47	N 100 B				
		150	0·70	34·18	27·43	7·89	119						
		200	1·10	34·33	27·52	7·83	113	5·02					
		300	1·65	34·48	27·60	7·81	119						
		400	1·88	34·66	27·73	7·81	134	3·93					
		600	1·89	34·67	27·74	7·83	114	3·90					
		800	1·73	34·70	27·78	7·85	106	3·86					
		1000	1·61	34·70	27·79	7·86	113	4·25					
		1500	1·10	34·71	27·83	7·88	113	4·42					
		2000	0·75	34·72	27·86	7·90	114	4·65					
		2500	0·43	34·70	27·87	7·91	115	4·74					
		3000	0·17	34·69	27·87	7·91	108	4·85					
359	26	0	1·42	33·82	27·09	8·06	100	—	N 50 V	100–0	1003	—	Hove to under lee of large tabular berg
		5	1·38	33·82	27·09	—	99	—	CWS	0			
		10	1·43	33·82	27·09	8·05	105	—	,,	5			
		20	1·43	33·84	27·11	8·06	108	—	,,	10			
		30	1·43	33·84	27·11	8·06	103	—	,,	20			
		40	1·43	33·84	27·11	8·05	104	—	,,	30			
		50	1·42	33·84	27·11	8·04	105	—	,,	40			
		60	1·42	33·84	27·11	8·05	103	—	,,	50			
		80	1·51	33·84	27·10	8·07	108	—	,,	60			
		100	1·50	33·86	27·12	8·07	115	—	,,	80			
		150	0·12	33·96	27·28	7·87	129	—	,,	100	—	1115	
		200	0·07	34·22	27·49	7·87	140	—	TYFB	99–0	1329	1356	
		300	1·20	34·47	27·63	7·80	147						
360	26	0	1·32	33·87	27·14	8·04	106	—	N 50 V	100–0	2020		
		10	1·32	33·87	27·14	8·03	108	—	N 70 V	50–0			
		20	1·32	33·87	27·14	8·03	108	—	,,	100–50			
		30	1·32	33·87	27·14	8·03	108	—	,,	250–100			
		40	1·32	33·87	27·14	8·03	118	—	,,	500–250			
		50	1·32	33·87	27·14	8·03	111	—	,,	750–500	—	2330	
		60	1·32	33·89	27·15	8·02	109	—	N 70 B	115–0	0037	0057	KT
		80	0·70	33·95	27·24	7·95	132	—	N 100 B				
		100	0·31	34·00	27·30	7·89	144						

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
360 *cont.*	55° 53′ S, 32° 33′ W to 55° 50′ S, 32° 26½′ W	1930 24–25 ii											
361	55° 53½′ S, 30° 46′ W to 55° 52½′ S, 30° 44′ W	25 ii	0900	3409	W × N	10	W × N	2–3	o.	1013·5	1·8	1·5	heavy SW swell
			1251	—	W	10	W	3	o.	1014·1	3·5	3·0	mod. SW swell
362	56° 04′ S, 29° 15′ W to 56° 03¼′ S, 29° 20′ W	25 ii	1827	3370	NW × W	18	NW × W	4	o. m. d.	1012·3	1·3	1·3	mod. WNW swell
			2300	—	NW × W	18	NW × W	5	o. m. d.	1011·8	1·2	1·2	mod. NW swell
363	2·5 miles S 80° E of SE point of Zavodovski I, S Sandwich Is	26 ii	1430	329 Sc.	W	20	W	4	o. m.	1005·7	2·3	1·8	mod. W swell
364	7 cables E of Penguin Pt, Visokoi I, S Sandwich Is	1 iii	1620	33	WNW	22	SW	4	o. r.	995·8	1·0	1·0	mod. S swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	TIME To	Remarks
360 *cont.*	26	150	0·55	34·14	27·40	7·83	144						
		200	0·86	34·32	27·53	7·80	144						
		300	1·74	34·52	27·63	7·81	139						
		400	1·74	34·58	27·68	7·79	139						
		600	1·75	34·67	27·75	7·82	134						
		800	1·58	34·69	27·78	7·86	129						
		1000	1·12	34·69	27·81	7·86	133						
		1500	0·70	34·69	27·84	7·90	144						
		2000	0·38	34·65	27·82	7·89	134						
		2500	0·15	34·63	27·82	7·90	136						
		3000	–0·03	34·63	27·83	7·90	142						
361	27	0	1·10	33·87	27·15	8·04	100	6·09	**N 50 V**	100–0	0909		
		10	1·10	33·87	27·15	8·04	100	6·32	**N 70 V**	50–0			
		20	1·10	33·87	27·15	8·04	103	6·26	,,	100–50			
		30	1·10	33·87	27·15	8·04	103	—	,,	250–100			
		40	1·09	33·87	27·15	8·04	104	6·25	,,	500–250			
		50	1·08	33·86	27·14	8·04	110	—	,,	750–500			
		60	0·76	33·88	27·18	8·04	104	6·22	,,	1000–750	—	1220	
		80	–0·55	34·07	27·40	7·88	136	—	**N 70 B**	91–0	1230	1250	KT
		100	–0·40	34·16	27·47	7·86	151	5·33	**N 100 B**				
		150	0·98	34·45	27·62	7·82	151						
		200	1·18	34·52	27·67	7·80	145	4·09					
		300	1·50	34·61	27·72	7·81	151						
		400	1·50	34·65	27·75	7·85	139	4·07					
		600	1·45	34·67	27·77	7·89	137	3·96					
		800	1·11	34·67	27·79	7·88	144	4·15					
		1000	0·88	34·67	27·81	7·88	142	4·26					
		1500	0·41	34·65	27·82	7·88	137	4·34					
		2000	0·20	34·65	27·83	7·90	144	4·45					
		2500	–0·01	34·65	27·84	7·92	142	4·46					
		3000	–0·09	34·65	27·85	7·93	140	4·73					
362	27	0	1·00	33·80	27·10	8·05	105	—	**N 50 V**	100–0	1835		
		10	1·00	33·80	27·10	8·06	105	—	**N 70 V**	50–0			
		20	0·95	33·80	27·11	8·05	96	—	,,	100–50			
		30	0·92	33·79	27·10	8·06	94	—	,,	250–100			
		40	0·91	33·80	27·11	8·06	96	—	,,	500–250			
		50	0·90	33·79	27·10	8·06	98	—	,,	750–500			
		60	0·82	33·81	27·12	8·06	96	—	,,	1000–750	—	**2146**	
		80	–0·71	34·05	27·39	7·93	128	—	**N 70 B**	97–0	**2241**	**2301**	KT
		100	–0·70	34·16	27·48	7·88	134	—	**N 100 B**				
		150	–0·30	34·42	27·67	7·84	132						
		200	0·12	34·52	27·73	7·82	142						
		300	0·50	34·61	27·79	7·81	151						
		400	0·61	34·67	27·83	7·81	142						
		600	0·70	34·67	27·82	7·85	142						
		800	0·57	34·67	27·83	7·90	137						
		1000	0·43	34·68	27·84	7·89	130						
		1500	0·22	34·67	27·85	7·89	133						
		2000	0·04	34·67	27·86	7·88	137						
		2500	0·00	34·65	27·84	7·90	130						
		3000	–0·16	34·65	27·85	7·90	133						
363	28	0	0·90	33·86	27·16	8·07	—	—	**LH**	51	1200	1230	
		300	0·43	34·62	27·80	7·84	—	—	**DLH**	329–278	1507	1510	
364	28	0	0·49	33·95	27·25	—	—	—	**N 100 H**	0	1620	1720	Nets streamed from anchored ship
									,,	0	1720	1820	
									,,	0	**2145**	**2245**	

Current Measurements

Depth	Speed cm/sec	Direction
10	0·28	N 58° E
15	0·31	S 72½° E

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
365	Between Visokoi and Candlemas Is, S Sandwich Is	1930 2 iii	1300	1536	S	2	—	0	o.	1007·2	−0·5	−1·3	heavy SW swell
	56° 55′ S, 27° 02′ W to 56° 53′ S, 26° 59′ W		1604	—	NE	5	NE	2–3	o.	1006·9	−0·5	−1·2	heavy conf. W swell
366	4 cables S of Cook I, S Sandwich Is	6 iii	1107	340 bk. S.	NNW	20	NNW	4	o. s. q.	982·7	1·4	1·2	mod. E swell
			1115	322									
			1120	155									
			1240	77									
			1340	152									
367	Beach Pt, Thule I, S Sandwich Is	7 iii	1600	—	N	6	N	2	o. f.	996·9	0·8	0·8	slight N swell
368	Douglas Strait, Southern Thule, S Sandwich Is, 1 mile N of Twitcher Rock	8 iii	0958 1233	655 bk. M.	N × E	3	N × E	3	o. m. e.	1001·6	−0·5	−0·5	slight conf. swell
369	Between Southern Thule and Bristol I, S Sandwich Is	9 iii	0850	1766	WNW	15	WNW	3	o. f.	975·3	0·5	0·5	mod. conf. swell
	59° 17¼′ S, 26° 57′ W		1215	—	NW × W	12	NW	3	b. c.	972·8	0·5	0·2	,,
370	2 miles NE of Bristol I, S Sandwich Is	10 iii	1010	106	SW	27	SW	5	o. s.	970·3	−1·3	−1·3	heavy conf. S swell
			1030	80									
			1055	18									

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
365	1	0	0·49	33·80	27·13	8·09	89	5·90	N 50 V	100–0	1305		
		10	0·42	33·80	27·14	8·09	95	6·06	N 70 V	50–0			
		20	0·38	33·80	27·14	8·10	89	5·87	,,	100–50			
		30	0·38	33·80	27·14	8·09	90	—	,,	250–100			
		40	0·38	33·80	27·14	8·09	90	5·85	,,	500–250			
		50	0·36	33·80	27·14	8·08	93	—	,,	750–500			
		60	−0·20	33·91	27·26	8·02	103	5·68	,,	1000–750	—	1505	
		80	−1·05	34·17	27·50	7·92	136	—	N 70 B	175–0	1524	1540	KT
		100	−0·94	34·29	27·59	7·88	139	4·84	N 100 B				
		150	−0·35	34·42	27·67	7·86	145	—	TYFB	350–0	1524	1605	
		200	0·15	34·52	27·73	7·86	147	4·47					
		300	0·51	34·61	27·79	7·85	139						
		400	0·55	34·65	27·82	7·87	145	4·51					
		600	0·52	34·67	27·84	7·90	147	4·20					
		800	0·39	34·67	27·84	7·90	142	4·31					
		1000	0·34	34·65	27·83	7·90	144	4·39					
		1500	0·27	34·65	27·83	7·91	145	4·15					
366	6	0	0·20	34·05	27·35	—	—	—	DLH	322–155	1115	1120	
		275	−0·02	34·66	27·85	—	—	—	OTL				
									N 7–T	77–152	1250	1341	
									N 4–T				
									LH	20	1900	—	At anchorage
367	7	—	—	—	—	—	—	—	Sh. Coll.	—	1420	1600	
368	8	0	0·11	34·02	27·33	8·05	—	—	N 50 V	100–0	1000		
		10	0·10	34·04	27·35	8·05	—	—	N 70 V	50–0			
		20	0·10	34·05	27·35	8·05	—	—	,,	100–50			
		30	0·09	34·05	27·35	8·05	—	—	,,	250–100			
		40	0·07	34·05	27·36	8·05	—	—	,,	500–250	—	1050	
		50	0·05	34·05	27·36	8·05	—	—	N 70 B	146–0	1112	1132	KT
		60	0·05	34·05	27·36	8·03	—	—	N 100 B				
		80	0·02	34·07	27·37	8·03	—	—	DLH	653	1209	1214	
		100	0·01	34·10	27·40	8·02							
		150	0·10	34·11	27·41	8·02							
		200	0·78	34·16	27·48	7·95							
		300	1·60	34·36	27·67	7·86							
		400	1·60	34·36	27·67	7·83							
		600	−1·63	34·36	27·67	7·83							
369	9	0	0·28	34·01	27·31	8·06	90	—	N 50 V	100–0	0855		
		10	0·22	34·01	27·32	8·06	93	—	N 70 V	50–0			
		20	0·20	34·01	27·32	8·06	91	—	,,	100–50			
		30	0·18	34·00	27·31	8·06	88	—	,,	250–100			
		40	0·08	34·04	27·35	8·06	100	—	,,	500–250			
		50	−0·30	34·07	27·39	8·03	100	—	,,	750–500			
		60	−0·39	34·16	27·47	7·97	106	—	,,	1000–750	—	1053	
		80	0·60	34·24	27·54	7·91	115	—	N 70 B	128–0	1134	1155	KT
		100	−0·91	34·41	27·69	7·87	125	—	N 100 B				
		150	−0·50	34·50	27·75	7·82	126	—	TYFB	275–0	1134	1213	
		200	−0·31	34·58	27·80	7·83	140						
		300	−0·05	34·60	27·81	7·83	144						
		400	0·15	34·67	27·85	7·83	137						
		600	0·22	34·67	27·85	7·86	134						
		800	0·19	34·69	27·87	7·88	134						
		1000	0·14	34·69	27·87	7·88	134						
		1500	−0·05	34·68	27·87	7·88	132						
370	10	0	0·13	33·93	27·26	—	—	—	OTL	80–18	1034	1054	
		27	0·10	33·96	27·28	—	—	—	N 7–T				
									N 4–T				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
371	1 mile E of Montagu I, S Sandwich Is	1930 14 iii	1000	110	SW	25	SW	5	o. u.	971·2	−1·0	−1·5	mod. SW swell
			1005	99									
			1040	161									
372	57° 57′ S, 29° 53′ W	18–19 iii	2100	2972 S. Di. sm. St.	NE	19	NE	3	o. f.	980·3	0·2	0·2	mod. NE swell
			0049	—	NE	18	NE	2–3	o. m. s.	979·1	0·2	0·2	,,
373	58° 00′ S, 33° 44′ W	19 iii	1855	2515 di. Oz.	W × S	10	W	2	o.	973·3	2·0	2·0	mod. NW swell
			2210	—	WSW	7	WSW	2	o.	976·0	1·3	1·2	,,
374	57° 55′ S, 37° 30′ W	20 iii	1730	3568	W × S	9	WSW	3	o.	981·6	−2·5	−2·6	heavy conf. SW swell
			2230	—	E	5	—	0	o.	978·0	−1·3	−1·3	slight conf. swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS: Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS: Gear	Depth (metres)	TIME: From	To	Remarks
371	14	0	0·00	33·91	27·25		—	—	OTL	99–161	1012	1036	
		150	−0·49	34·45	27·70	—	—	—	N 7-T				
									N 4-T				
372	18	0	0·41	33·82	27·15	8·04	—	—	N 70 B	124–0	2117	2136	KT
		10	0·42	33·82	27·15	8·05	—	—	N 100 B				
		20	0·42	33·83	27·16	8·05	—	—	TYFB	240–0	2117	2155	
		30	0·42	33·83	27·16	8·05	—	—	N 50 V	100–0	2214		
		40	0·40	33·84	27·17	8·05	—	—	N 70 V	50–0			
		50	0·40	33·85	27·18	8·05	—	—	,,	100–50			
		60	0·20	33·94	27·26	8·04	—	—	,,	250–100			
		80	−0·75	34·20	27·52	7·91	—	—	,,	500–250			
		100	−0·50	34·32	27·60	7·85	—	—	,,	750–500			
		150	0·40	34·51	27·71	7·84	—	—	,,	1000–750	—	0004	
		200	0·88	34·60	27·75	7·83							
		300	1·01	34·63	27·78	7·86							
		400	0·93	34·69	27·82	7·86							
		600	0·80	34·69	27·83	7·91							
		800	0·56	34·70	27·86	7·91							
		1000	0·41	34·70	27·86	7·92							
		1500	0·20	34·69	27·87	7·92							
		2000	−0·02	34·69	27·88	7·93							
		2500	−0·14	34·68	27·88	7·94							
373	19	0	1·42	33·91	27·16	8·12	—	—	N 70 B	132–0	1914	1934	KT
		10	1·40	33·92	27·17	8·12	—	—	N 100 B				
		20	1·38	33·93	27·17	8·12	—	—	TYFB	275–0	1914	1949	
		30	1·36	33·93	27·17	8·12	—	—	N 50 V	100–0	1959		
		40	1·35	33·93	27·18	8·12	—	—	N 70 V	50–0			
		50	1·34	33·95	27·20	8·12	—	—	,,	100–50			
		60	1·12	33·96	27·22	8·11	—	—	,,	250–100			
		80	0·60	34·07	27·34	8·04	—	—	,,	500–250			
		100	0·21	34·19	27·46	7·97	—	—	,,	750–500			
		150	0·75	34·36	27·57	7·89	—	—	,,	1000–750	—	2204	
		200	1·10	34·43	27·60	7·87							
		300	1·55	34·54	27·66	7·85							
		400	1·33	34·60	27·72	7·88							
		600	1·27	34·69	27·79	7·92							
		800	1·09	34·70	27·82	7·92							
		1000	0·77	34·70	27·84	7·95							
		1500	0·49	34·70	27·86	7·95							
		2000	0·25	34·69	27·86	7·96							
		2400	0·06	34·69	27·87	7·96							
374	20	0	1·16	34·04	27·28	8·09	—	—	N 100 B	125–0	1757	1817	
		10	1·20	34·04	27·28	8·09	—	—	TYFB	270–0	1757	1839	
		20	1·21	34·04	27·28	8·09	—	—	N 50 V	100–0	1847		
		30	1·20	34·04	27·28	8·09	—	—	N 70 V	50–0			
		40	1·20	34·04	27·28	8·09	—	—	,,	100–50			
		50	1·20	34·04	27·28	8·09	—	—	,,	250–100			
		60	1·20	34·06	27·30	8·09	—	—	,,	500–250			
		80	0·90	34·18	27·41	8·03	—	—	,,	750–500			
		100	0·79	34·19	27·43	7·99	—	—	,,	1000–750			
		150	0·89	34·42	27·61	7·87	—	—	,,	2000–0	—	2135	
		200	1·16	34·52	27·67	7·86							
		300	1·39	34·62	27·74	7·86							
		400	1·65	34·71	27·79	7·88							
		600	1·47	34·72	27·81	7·91							
		800	1·17	34·73	27·84	7·93							
		1000	1·00	34·73	27·85	7·93							
		1500	0·40	34·72	27·88	7·93							
		2000	0·27	34·70	27·87	7·93							

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
374 *cont.*	57° 55′ S, 37° 30′ W	1930 20 iii											
375	57° 47′ S, 40° 49′ W	21 iii	1240	3665 di. Oz.	SSW	19	SW	5	b.	994·3	−1·8	−1·8	mod. SW swell
			1831	—	WNW	21	WNW	5	c.	999·5	2·0	2·0	mod. conf. swell
376	62° 33′ S, 59° 19½′ W	11 iv	1430	1308 S. di. Oz.	W	8	W	1–2	o.	976·5	1·0	0·7	slight W swell
			1653	—	E	6	—	0–1	o.	976·3	0·2	0·2	mod. conf. swell
377	62° 52′ S, 58° 43′ W	12 iv	2030	768 gy. M. S.	SW	22	SW	3	o.	996·9	−2·7	−2·7	mod. SW swell
			2245	—	WSW	38	WSW	7	c. q.	996·6	−2·7	−3·5	mod. conf. swell
378	62° 21½′ S, 60° 36′ W	13 iv	1130	119 M. S. bk. Sp.	WSW	20	WSW	4	o. s.	1002·4	−1·8	−2·1	mod. WSW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
374 *cont.*	20	2500	0·08	34·70	27·88	7·93							
		3000	−0·09	34·69	27·88	7·95							
		3400	−0·20	34·69	27·89	7·95							
375	21	0	2·00	33·95	27·15	8·10	—	—	**N 70 B**	95–0	1259	1318	KT
		10	2·00	33·95	27·15	8·11	—	—	**N 100 B**				
		20	2·00	33·94	27·15	8·10	—	—	**N 50 V**	100–0	1343		
		30	2·00	33·95	27·15	8·10	—	—	**N 70 V**	50–0			
		40	2·00	33·95	27·15	8·10	—	—	,,	100–50			
		50	2·00	33·95	27·15	8·10	—	—	,,	250–100			
		60	1·99	33·95	27·15	8·10	—	—	,,	500–250			
		80	1·66	33·99	27·21	8·06	—	—	,,	750–500			
		100	0·90	34·11	27·36	7·98	—	—	,,	1000–750			
		150	0·53	34·34	27·57	7·87	—	—	,,	2000–1000	—	1624	
		200	1·03	34·47	27·64	7·85							
		300	1·40	34·56	27·69	7·85							
		400	1·62	34·65	27·74	7·85							
		600	1·60	34·69	27·78	7·90							
		800	1·57	34·72	27·81	7·91							
		1000	1·32	34·72	27·82	7·91							
		1500	0·91	34·73	27·86	7·93							
		2000	0·51	34·71	27·86	7·93							
		2500	0·26	34·69	27·86	7·94							
		3000	0·08	34·67	27·86	7·95							
376	13	0	0·30	34·04	27·34	8·00	104	—	**N 50 V**	100–0	1444	—	+ 3 hours G.M.T.
		10	0·26	34·04	27·34	8·00	98	—	**N 70 V**	50–0			
		20	0·24	34·04	27·34	8·00	100	—	,,	100–50			
		30	0·20	34·04	27·34	8·00	100	—	,,	250–100			
		40	0·11	34·05	27·35	8·00	103	—	,,	500–250			
		50	0·10	34·05	27·35	7·99	105	—	,,	750–500			
		60	0·07	34·09	27·39	8·00	105	—	,,	1000–750	—	1641	
		80	0·03	34·14	27·43	7·96	116	—	**N 70 B**	102–0	1647	1707	KT
		100	−0·70	34·20	27·51	7·96	133	—	**N 100 B**				
		150	−0·92	34·22	27·54	7·94	133						
		200	0·10	34·34	27·59	7·90	136						
		300	0·25	34·48	27·69	7·87	134						
		400	−0·06	34·51	27·73	7·87	139						
		600	−0·49	34·52	27·76	7·89	140						
		800	−0·85	34·52	27·78	7·91	129						
		1000	−1·12	34·54	27·80	7·91	128						
		1250	−1·49	34·56	27·83	7·93	133						
377	14	0	−1·16	34·13	27·47	8·02	104	—	**N 70 V**	50–0	2045	2055	
		10	−1·11	34·13	27·47	8·01	98						
		20	−1·11	34·11	27·46	8·00	118						
		30	−1·10	34·11	27·46	8·00	99						
		40	−1·10	34·11	27·46	8·00	109						
		50	−1·09	34·11	27·46	8·00	118						
		60	−1·08	34·13	27·47	7·99	109						
		80	−1·20	34·22	27·55	7·96	110						
		100	−1·35	34·29	27·61	7·93	120						
		150	−0·95	34·42	27·70	7·90	130						
		200	−0·80	34·45	27·72	7·88	130						
		300	−0·88	34·47	27·74	7·94	132						
		400	−1·02	34·50	27·77	7·93	134						
		600	−0·79	34·52	27·77	7·94	139						
		700	−0·83	34·52	27·78	7·94	137						
378	15	0	0·39	34·04	27·33	8·06	115	6·83	**N 50 V**	100–0	1142		
		10	0·40	34·04	27·33	8·06	113	7·18	**N 70 V**	50–0			
		20	0·40	34·06	27·35	8·06	108	6·64	,,	100–50	—	1210	

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
378 *cont.*	62° 21½′ S, 60° 36′ W	1930 13 iv											
379	62° 14¼′ S, 60° 43¼′ W	13 iv	1403	—	SW	18	SW	4	b.c.p.s.	1002·5	− 2·0	− 2·6	heavy conf. W swell
380	62° 05½′ S, 60° 53½′ W	13 iv	1518	—	SW	20	SW	5	o.	1002·7	− 2·0	− 2·4	heavy conf. W swell
381	61° 56¾′ S, 61° 03¾′ W	13 iv	1628	—	SW	20	SW	5	c.	1002·4	− 2·5	− 2·8	heavy conf. WNW swell
382	61° 27½′ S, 61° 38½′ W	13–14 iv	1938	3647 f. gy. M. S.	SSW	16	SSW	2–3	o.	1003·9	2·0	1·5	mod. SW swell
			0038	—	SSW	16	SSW	2–3	o.	1003·9	− 3·0	− 3·6	heavy WSW swell
383	60° 32′ S, 62° 42′ W	14 iv	0638	3744 f. gy. M. S.	S W	8	S	3	o.	1007·5	2·5	2·3	mod. S swell
			1055	—	S E	10	S · E	2–3	o.	1009·7	− 1·3	− 1·8	mod. SSW swell
384	59° 36½′ S, 63° 43½′ W	14 iv	1625	3663 gy. M. S. St.	SE E	15	SE E	2	o.	1009·4	− 1·0	− 1·2	slight SW swell
			2031	—	SE E	9	SE E	2	o.	1008·4	− 0·5	− 0·5	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
378 *cont.*	15	30	0·40	34·07	27·36	8·06	101	—	**N 70 B**	71–0	1247	1307	KT
		40	0·40	34·07	27·36	8·06	109	6·70	**N 100 B**				
		50	0·41	34·09	27·37	8·05	111						
		60	0·41	34·13	27·40	8·04	115	6·51					
		80	0·42	34·19	27·45	8·00	121						
		100	0·40	34·28	27·52	7·99	123	5·83					
379	15	0	0·10	34·04	27·35	7·95	83	—	**N 50 V**	100–0	1415	1425	
380	15	0	0·30	33·93	27·25	7·97	98	—	**N 50 V**	100–0	1525	1535	
381	15	0	0·00	33·89	27·23	8·00	100	—	**N 50 V**	100–0	1636	1646	
382	15	0	0·32	33·78	27·13	8·10	123	—	**N 50 V**	100–0	**1958**		
		10	0·32	33·77	27·12	8·10	113	—	**N 70 V**	50–0			
		20	0·32	33·78	27·13	8·10	116	—	,,	100–50			
		30	0·31	33·78	27·13	8·10	123	—	,,	250–100			
		40	0·32	33·78	27·13	8·10	120	—	,,	500–250			
		50	0·31	33·77	27·12	8·10	114	—	,,	750–500			
		60	0·00	33·82	27·18	8·04	114	—	,,	1000–750	—	**0000**	
		80	−1·20	34·01	27·38	7·99	120	—	**N 70 B**	77–0	**0130**	**0150**	KT
		100	−0·49	34·10	27·42	7·96	128	—	**N 100 B**				
		150	0·39	34·22	27·47	7·92	136						
		200	1·30	34·34	27·52	7·88	139						
		300	1·93	34·49	27·59	7·85	142						
		400	1·95	34·56	27·65	7·84	147						
		600	1·96	34·62	27·69	7·87	145						
		800	1·93	34·65	27·72	7·90	142						
		1000	1·81	34·66	27·73	7·94	133						
		1500	1·41	34·67	27·77	7·95	137						
		2000	1·11	—	—	7·95	137						
		2500	0·78	—	—	7·96	134						
		3000	0·57	34·67	27·83	7·97	136						
		3500	0·51	—	—	7·99	136						
383	16	0	0·45	33·85	27·18	8·05	105	6·69	**N 50 V**	100–0	0703	—	+4 hours G.M.T.
		10	0·46	33·85	27·18	8·05	113	6·75	**N 70 V**	50–0			
		20	0·46	33·84	27·17	8·04	103	6·55	,,	100–50			
		30	0·46	33·84	27·17	8·05	101	—	,,	250–100			
		40	0·46	33·85	27·18	8·05	105	6·74	,,	500–250			
		50	0·46	33·85	27·18	8·04	108	—	,,	750–500			
		60	0·46	33·84	27·17	8·04	106	6·71	,,	1000–750			
		80	0·45	33·84	27·17	8·03	109	—	,,	1500–1000			
		100	−0·60	33·96	27·31	7·95	114	6·14	,,	2000–1500	—	1035	
		150	0·14	34·23	27·50	7·86	133	—	**N 70 B**	102–0	1053	1113	KT
		200	1·35	34·48	27·62	7·83	147	4·05	**N 100 B**				
		300	1·78	34·60	27·69	7·82	145						
		400	1·85	34·62	27·70	7·84	147	3·65					
		600	1·84	34·63	27·71	7·88	140	4·07					
		800	1·78	34·65	27·73	7·90	136	3·77					
		1000	1·63	34·67	27·76	7·93	132	3·30					
		1500	1·25	34·67	27·78	7·93	133	3·67					
		2000	0·93	34·66	27·80	7·92	137	3·32					
		2500	0·68	34·65	27·81	7·93	139	2·86					
		3000	0·52	34·65	27·81	7·94	139	3·13					
		3500	0·48	34·64	27·81	7·94	136	4·43					
384	16	0	2·02	33·86	27·07	8·07	115	—	**N 50 V**	100–0	1655		
		10	2·02	33·86	27·07	8·06	115	—	**N 70 V**	50–0			
		20	2·07	33·87	27·08	8·05	115	—	,,	100–50			
		30	2·10	33·88	27·09	8·06	115	—	,,	250–100			
		40	2·12	33·88	27·09	8·05	113	—	,,	500–250			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
384 *cont.*	59° 36½′ S, 63° 43½′ W	1930 14 iv											
385	58° 41′ S, 64° 43½′ W	15 iv	0224	3638 gy. M. f. S.	ENE	23	ENE	5	o.	1003·1	1·0	0·7	mod. conf. NE swell
			0840	—	NE × E	23	NE × E	6	o.	1002·1	0·8	0·8	heavy NE swell
386	57° 45½′ S, 65° 42′ W	15 iv	1416	4775 gy. M. f. S.	ENE	20	ENE	4	o. r.	998·0	2·5	2·3	heavy E swell
			1910	—	ENE	20	ENE	5	o. p. s.	996·4	3·5	3·2	heavy NE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	TIME To	Remarks
384 *cont.*	16	50	2·15	33·87	27·08	8·05	116	—	**N 70 V**	750–500			
		60	2·18	33·88	27·08	8·05	116	—	,,	1000–750			
		80	2·21	33·88	27·08	8·05	116	—	,,	1500–1000	—	**2021**	
		100	1·80	34·00	27·21	8·00	—	—	**N 70 B**	98–0	**2032**	**2052**	KT
		150	1·04	34·07	27·32	7·94	125	—	**N 100 B**				
		200	0·88	34·11	27·36	7·94	125						
		300	1·40	34·22	27·41	7·87	128						
		400	1·90	34·32	27·45	7·86	130						
		600	2·22	34·56	27·62	7·86	144						
		800	2·17	34·63	27·69	7·86	137						
		1000	2·09	34·67	27·72	7·86	132						
		1500	1·77	34·69	27·76	7·90	130						
		2000	1·48	34·69	27·78	7·91	130						
		2500	1·02	34·68	27·81	7·90	136						
		3000	0·89	34·67	27·81	7·92	134						
		3500	0·54	34·66	27·82	7·92	134						
385	16	0	4·89	34·16	27·04	8·10	91	5·96	**N 50 V**	100–0	**0238**		
		10	4·89	34·16	27·04	8·10	91	6·00	**N 70 V**	50–0			
		20	4·90	34·15	27·03	8·10	90	6·23	,,	100–50			
		30	4·90	34·16	27·04	8·09	90	—	,,	250–100			
		40	4·90	34·15	27·03	8·10	91	6·25	,,	500–250			
		50	4·90	34·15	27·03	8·10	89	—	,,	750–500			
		60	4·90	34·16	27·04	8·10	91	6·37	,,	1000–750	—	**0750**	
		80	4·90	34·15	27·03	8·10	91	—	**N 70 B**	80–0	0836	0856	KT
		100	4·90	34·18	27·06	8·06	89	6·24	**N 100 B**				
		150	4·90	34·22	27·09	8·05	81						
		200	4·45	34·23	27·15	8·04	106	6·13					
		300	4·12	34·25	27·20	8·02	106						
		400	3·80	34·27	27·25	8·01	114	5·83					
		600	3·78	34·29	27·26	7·99	116	4·02					
		800	2·92	34·38	27·42	7·96	119	3·94					
		1000	2·73	34·47	27·51	7·91	130	4·04					
		1500	2·26	34·63	27·68	7·87	132	3·92					
		2000	2·09	34·67	27·72	7·96	132	4·94					
		2500	1·69	34·74	27·81	7·96	128	4·35					
		3000	1·25	34·74	27·84	7·96	129	3·82					
		3500	1·13	34·72	27·83	8·00	129	3·50					
386	17	0	5·00	34·15	27·02	8·08	88	—	**N 50 V**	100–0	1427		
		10	5·00	34·14	27·02	8·08	86	—	**N 70 V**	50–0			
		20	5·00	34·15	27·02	8·09	86	—	,,	100–50			
		30	5·00	34·15	27·02	8·08	85	—	,,	250–100			
		40	5·00	34·14	27·02	8·08	85	—	,,	500–250			
		50	5·00	34·14	27·02	8·08	86	—	,,	750–500			
		60	5·00	34·16	27·03	8·09	88	—	,,	1000–750	—	1737	
		80	5·00	34·17	27·04	8·08	86	—	**N 70 B**	77–0	1746	1806	KT
		100	5·00	34·16	27·03	8·07	90	—	**N 100 B**				
		150	5·00	34·16	27·03	8·07	91						
		200	4·58	34·20	27·11	8·06	94						
		300	4·41	34·22	27·14	8·06	111						
		400	4·24	34·23	27·17	8·05	103						
		600	3·83	34·24	27·22	8·05	104						
		800	3·29	34·27	27·30	8·00	106						
		1000	2·89	34·36	27·40	7·94	133						
		1500	2·39	34·56	27·62	7·89	133						
		2000	2·17	34·65	27·70	7·97	133						
		2500	1·79	34·70	27·77	8·01	130						
		3000	1·42	34·70	27·80	8·00	126						
		3500	1·13	34·70	27·82	8·00	133						
		4500	0·96	34·69	27·82	7·99	128						

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
387	56° 50′ S, 66° 39′ W	1930 16 iv	0040	3102	ENE	22	ENE	5	o. p.	994·7	4·0	3·8	heavy ENE swell
			0536	—	ENE	22	ENE	4	o.	996·1	3·8	3·6	,,
388	56° 19½′ S, 67° 09¾′ W	16 iv	0840	121	NE × E	17	NE × E	3	o.	997·5	5·5	5·2	mod. ENE swell
389	56° 19½′ S, 63° 34½′ W	16 iv	2108	—	N × E	16	N × E	3	o. p. d.	1003·2	3·6	3·6	heavy ENE swell
390	56° 09½′ S, 56° 45′ W	17 iv	2100	5002*	NNW	12	NNW	3	o. d.	998·3	4·5	4·2	slight N swell
391	55° 48½′ S, 52° 35′ W	18 iv	0930	4305*	NW × N	16	NW × N	2	o. d.	988·2	3·2	3·0	mod. NW swell
392	55° 36½′ S, 50° 22½′ W	18 iv	2100	—	SW	20	SW	5	b. c.	981·5	1·0	− 1·0	mod. conf. W swell
393 A	54° 17′ S, 35° 30′ W	7 v	1320	333	NW	4	—	0	o. f.	992·7	2·0	2·0	mod. NW swell
393 B	54° 17′ S, 35° 30′ W	7 v	1840	—	—	0	—	0	o. f.	985·0	1·6	1·6	slight NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
387	17	0	5·45	34·12	26·95	8·10	91	5·97	N 50 V	100–0	0050		
		10	5·42	34·12	26·95	8·10	90	6·17	N 70 V	50–0			
		20	5·32	34·13	26·97	8·09	91	6·16	,,	100–50			
		30	5·29	34·12	26·96	8·10	91	—	,,	250–100			
		40	5·22	34·13	26·98	8·10	90	6·19	,,	500–250			
		50	5·21	34·13	26·98	8·09	89	—	,,	750–500			
		60	5·21	34·14	26·99	8·08	88	6·21	,,	1000–750	—	0333	
		80	5·20	34·14	26·99	8·09	81	—	N 70 B	71–0	0519	0538	KT
		100	5·20	34·17	27·01	8·09	85	5·94	N 100 B				
		150	5·11	34·18	27·03	8·08	79						
		200	4·78	34·19	27·08	8·07	84	5·67					
		300	4·61	34·22	27·12	8·06	94						
		400	4·40	34·23	27·15	8·04	100	5·65					
		600	3·81	34·25	27·23	8·05	94	5·43					
		800	3·26	34·28	27·31	8·01	125	4·51					
		1000	3·01	34·34	27·38	8·00	132	3·78					
		1500	2·56	34·49	27·54	7·93	139	3·57					
		2000	2·26	34·61	27·66	7·94	140	3·30					
		2500	2·03	34·68	27·73	7·95	133	3·62					
		3000	1·87	34·67	27·74	7·96	132	3·31					
388	17	0	7·59	33·58	26·24	8·11	74	—	N 50 V	100–0	0847		
		10	7·59	33·58	26·24	8·12	69	—	N 70 V	50–0			
		20	7·59	33·59	26·25	8·11	71	—	,,	100–50	—	0913	
		30	7·59	33·59	26·25	8·09	83	—	N 70 B	106–0	1003	1018	KT
		40	7·41	33·73	26·38	8·10	78	—	N 100 B				
		50	7·32	33·78	26·44	8·09	78	—	DLH	121	0942	0945	
		60	7·31	33·87	26·51	8·09	81						
		80	7·11	33·96	26·61	8·08	81						
		100	7·06	34·00	26·64	8·08	81						
		120	7·05	34·02	26·66	8·08	76						
389	18	0	4·35	34·11	27·06	—	—	—	N 70 B	110–0	2115	2133	KT
									N 100 B				
390	19	0	4·85	34·14	27·03	—	—	—	N 70 B	82–0	2117	2137	KT
									N 100 B				
391	20	1205	2·00	—	—	—	—	—	N 450 H	1200–1300 (–0)	1026	1226	
392	20	0	3·90	34·05	27·06	—	—	—	N 70 B	101–0	2115	2135	KT
									N 100 B				
393 A	9	0	1·71	33·87	27·11	8·08	109	6·58	N 50 V	100–0	1321	—	+ 2 hours G.M.T.
		10	1·70	33·87	27·11	8·08	89	6·23	N 70 V	75–0			
		20	1·70	33·87	27·11	8·08	99	6·36	,,	150–75			
		30	1·70	33·88	27·12	8·08	104	—	,,	225–150			
		40	1·70	33·88	27·12	8·08	109	6·55	,,	300–225	—	1420	
		50	1·66	33·89	27·13	8·06	104	—	N 100 B	57–0	1511	1531	
		60	1·66	33·90	27·14	8·06	115	6·44	,,	115–57	1511	1532	KT
		80	1·55	33·90	27·15	8·05	111	—	,,	182–115	1511	1532½	
		100	1·50	33·95	27·19	8·05	110	6·36	,,	250–182	1511	1533	DGB
		150	1·45	34·03	27·26	7·99	111						
		200	1·30	34·16	27·37	7·94	137	5·14					
		300	1·82	34·48	27·59	7·93	134	4·08					
393 B	9	0	1·70	33·86	27·10	8·08	109	6·63	N 50 V	100–0	1847		
		10	1·70	33·87	27·11	8·07	109	6·69	N 70 V	75–0			
		20	1·69	33·87	27·11	8·08	109	6·55	,,	150–75			
		30	1·65	33·87	27·11	8·07	108	—	,,	225–150			
		40	1·62	33·87	27·12	8·08	115	6·50	,,	300–225	—	1935	

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
393 B *cont.*	54° 17′ S, 35° 30′ W	1930 7 v											
393 C	54° 17′ S, 35° 30′ W	7–8 v	2245	—	S	4	—	0	o. m. d.	981·6	1·2	1·2	slight NW swell
393 D	54° 17′ S, 35° 30′ W	8 v	0245	—	S	22	S	4	o. s. q.	979·6	0·5	0·5	mod. conf. swell
394	49° 52′ S, 24° 54½′ W	12 v	2100	—	SW	21	SW	5	o.	1003·6	2·7	1·4	mod. NW × W swell
395	48° 26¾′ S, 22° 10′ W to 48° 26½′ S, 22° 06½′ W	13 v	1054	3755*	SW	12	SW	3	o.	1006·3	2·8	1·2	heavy conf. W swell
			1740	—	NW × W	19	NW × W	4	o.	1006·6	3·0	1·5	mod. NW swell
396	45° 09¾′ S, 16° 34¾′ W	14 v	2134	3052*	NE	7	NE	0–1	c.	1016·5	5·0	3·5	mod. conf. swell
397	40° 28′ S, 10° 18′ W	16 v	2000	—	NE × E	14	N	3	b. c.	994·9	13·0	13·0	heavy NNW swell
398	Quest Bay, Gough I, at anchorage	17–18 v 18 v	1600	41	WNW	12	WNW	2	b. c.	1009·0	10·6	10·0	mod. conf. swell
399	1 mile SE of SW point of Gough I	18 v	1045 1112 1130	141 102 41	N × W	20–30	N × W	3	o. q. p. s.	1007·9	13·8	11·8	mod. conf. swell
400	39° 27′ S, 3° 24½′ W	20 v	2100	—	W × S	20	W × S	5	b.	1019·0	10·0	8·5	heavy W swell
401	37° 31½′ S, 4° 33′ E to 37° 29′ S, 4° 39½′ E	22 v	1021	—	WSW	10	WSW	2	b. c.	1027·0	12·7	9·5	heavy W swell
			1513	—	WNW	10	WSW	2	b. c.	1023·4	14·2	12·0	mod. W swell
402	37° 08′ S, 5° 58½′ E	22 v	2100	—	W × N	14	W × N	3	b.	1025·0	13·2	10·8	mod. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
393 B *cont.*	9	50	1·61	33·88	27·12	8·05	115	—	**N 100 B**	50–0	**2051**	**2110**	
		60	1·61	33·88	27·12	8·05	116	6·42	,,	100–50	**2051**	**2111**	KT
		80	1·60	33·92	27·16	8·04	115	—	,,	170–100	**2051**	**2111½**	
		100	1·60	33·95	27·18	8·04	114	6·40	,,	240–170	**2051**	**2112**	DGB
		150	1·55	33·95	27·18	8·02	115						
		200	1·44	34·09	27·30	7·99	118	5·86					
		300	1·82	34·48	27·59	7·89	132	3·99					
393 C	9	0	1·78	33·85	27·09	8·07	114	6·72	**N 50 V**	100–0	**2248**		
		10	1·72	33·86	27·10	8·07	106	6·53	**N 70 V**	75–0			
		20	1·71	33·87	27·11	8·07	106	6·58	,,	150–75			
		30	1·71	33·87	27·11	8·07	103	—	,,	225–150			
		40	1·70	33·87	27·11	8·06	100	6·50	,,	300–225	—	**2340**	
		50	1·59	33·88	27·13	8·06	110	—	**N 100 B**	61–0	**0027**	**0045**	
		60	1·58	33·88	27·13	8·05	116	6·47	,,	122–61	**0027**	**0046**	KT
		80	1·55	33·93	27·17	8·05	110	—	,,	186–122	**0027**	**0046½**	
		100	1·48	33·95	27·19	8·04	111	6·31	,,	250–186	**0027**	**0047**	DGB
		150	1·45	34·01	27·24	8·01	119						
		200	1·44	34·15	27·35	7·96	132	5·25					
		300	1·84	34·48	27·59	7·88	132	3·89					
393 D	9	0	1·70	33·84	27·09	8·07	110	6·55	**N 50 V**	100–0	**0255**		
		10	1·69	33·86	27·10	8·06	105	6·47	**N 70 V**	75–0			
		20	1·70	33·86	27·10	8·07	108	6·57	,,	150–75			
		30	1·68	33·86	27·10	8·06	108	—	,,	225–150			
		40	1·68	33·86	27·10	8·07	109	6·55	,,	300–225	—	**0420**	
		50	1·68	33·86	27·10	8·07	104						
		60	1·68	33·86	27·10	8·06	105	6·56					
		80	1·68	33·86	27·10	8·05	106						
		100	1·62	33·89	27·13	8·04	108	6·54					
		150	1·60	33·90	27·14	8·00	109						
		200	1·41	34·22	27·41	7·93	129	5·11					
		300	1·84	34·49	27·60	7·88	136	3·86					
394	14	0	4·15	33·96	26·96	—	—	—	**N 70 B** **N 100 B**	155–0	**2118**	**2138**	KT
395	15	0	4·77	34·00	26·93	—	—	—	**N 450 H**	1500–1600	1232	1532	DGB. + 1 hour G.M.T.
396	16	0	7·45	34·23	26·77	—	—	—	**N 70 B** **N 100 B**	155–0	**2109**	**2133**	KT
397	18	0	12·95	—	—	—	—	—	**N 70 B** **N 100 B**	93–0	**2013**	**2032**	KT. G.M.T.
398	19	—	—	—	—	—	—	—	**LH** **ND** **LH**	41 41	1500 0830	1800 0930	numerous hauls
399	19	—	—	—	—	—	—	—	**DLH** **ND** **LH**	141–102 41	1052 1130	1102 1845	
400	22	0	12·05	34·30	26·05	—	—	—	**N 70 B** **N 100 B**	100–0	**2117**	**2136**	
401	24	—	—	—	—	—	—	—	**TYFH** **NH**	1200–1300 0	1207 1300	1415	DGB. − 1 hour G.M.T.
402	24	0	16·05	34·79	25·58	—	—	—	**N 70 B** **N 100 B**	78–0	**2111**	**2130**	KT

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
403	34° 14′ S, 15° 01′ E	1930 24 v	1650	—	ENE	4–5	ENE	1	c.	1021·8	15·7	13·5	mod. SW swell
404	35° 34′ S, 15° 00½′ E	24 v	1842	—	—	0	—	0	b.	1021·6	15·8	13·4	mod. W swell
405	33° 50½′ S, 15° 46′ E to 34° 16′ S, 15° 02′ E	4 vi	0130	—	N × E	20	N	3	b. c.	1009·2	16·0	13·4	mod. to heavy WSW swell
			0820	—	NNE	10–12	conf.	3	o. p. s.	1006·5	14·0	13·6	heavy W swell
			1430	—	NNE	23	NNE	4	c. p.	1004·8	15·5	14·7	heavy conf. NW swell
406	6 cables NE of Roman Rock, Simon's Bay, Cape Peninsula	5 vi	1700	29	W	10	W	2	o. r.	1015·6	15·9	15·9	
407	35° 13′ S, 17° 50½′ E to 34° 57′ S, 17° 48′ E	12 vi	0830	2822*	SW × S	20–27	SW × S	3	o. r.	1017·6	14·9	14·0	mod. SW × S swell
			1843	—	SW × S	24	SW × S	4	c.	1026·5	12·4	9·7	heavy conf. swell
408	33° 04′ S, 17° 26′ E	20 viii	0720	412 h.	SSW	13	SSW	3	b. c.	1022·8	12·2	11·5	mod. SSW swell
409	33° 03′ S, 17° 02′ E	20 viii	1130	464 gn. M.	SSW	16	SSW	3	b. c.	1023·4	14·0	12·5	mod. SSW swell
410	33° 03′ S, 16° 38½′ E to 33° 03′ S, 16° 36′ E	20 viii	1455	1198 S. gl. Oz.	SSW	18	SSW	3	b. c.	1021·3	13·5	12·0	mod. SSW swell
			1829	—	SSW	15	SSW	3	c.	1022·5	13·5	10·5	mod. S swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
403	26	0	17·90	35·33	—	—	—	—	NH	0	1650		− 2 hours G.M.T.
404	26	—	—	—	—	—	—	—	N 70 B	101–0	2047	2107	KT
									N 100 B				
405	7	—	—	—	—	—	—	—	TYFB	450–0	0204	0356	DGB
									,,	1200–0	0915	1300	,,
									,,	2200–0	1619	2100	DGP
406	8	0	14·71	35·10	26·12	—	—	—	BNR	29	1704	1715	
		29	13·18	35·15	26·48								
407	15	—	—	—	—	—	—	—	TYFB	220–0	0855	1005	DGB
									N 200 B	150–0	1150	1304	,,
									,,	275–0	1150	1315	,,
									N 450 H	800–950	1505	1735	,,
408	25	0	13·53	35·03	26·31	8·32	25	5·44	N 50 V	100–0	0735		
		10	13·51	35·03	26·32	8·32	27	—	N 70 V	50–0			
		20	13·51	35·03	26·32	8·32	31	5·41	,,	100–50			
		30	13·39	35·03	26·35	8·32	31	—	,,	250–100			
		40	12·51	35·03	26·52	8·30	37	5·08	,,	390–250	—	0850	
		50	12·31	35·01	26·55	8·23	43	—	N 70 B	128–0	0906	0921	KT
		60	12·28	35·01	26·55	8·19	44	4·24	N 100 B				
		80	10·86	34·91	26·74	8·12	56						
		100	10·29	34·88	26·82	8·10	59	4·21					
		150	9·22	34·77	26·92	8·06							
		200	8·20	34·64	26·98	7·98	—	3·32					
		300	6·40	34·51	27·13	7·96							
		400	5·77	34·43	27·15	7·95	—	4·35					
409	25	0	15·79	35·32	26·05	8·33	27	—	N 50 V	100–0	1137		
		10	15·79	35·32	26·05	8·33	27	—	N 70 V	50–0			
		20	15·79	35·32	26·05	8·33	32	—	,,	100–50			
		30	15·73	35·32	26·06	8·33	32	—	,,	250–100			
		40	15·73	35·32	26·06	8·32	36	—	,,	440–250	—	1227	
		50	15·73	35·31	26·06	8·32	36	—	N 70 B	91–0	1241	1301	KT
		60	15·73	35·31	26·06	8·32	35	—	N 100 B				
		80	15·64	35·31	26·08	8·31	38						
		100	13·51	35·14	26·41	8·24	48						
		150	11·46	34·98	26·69	8·18							
		200	10·42	34·86	26·78	8·16							
		300	7·82	34·62	27·02	8·05							
		400	6·42	34·52	27·14	7·99							
410	26	0	15·82	35·27	26·00	8·32	24	5·36	N 50 V	100–0	1825	1835	
		10	15·81	35·30	26·03	8·32	24	—	N 70 V	50–0	1504		
		20	15·80	35·30	26·03	8·32	27	5·27	,,	100–50			
		30	15·78	35·30	26·04	8·32	26	—	,,	250–100			
		40	15·75	35·29	26·04	8·32	26	5·17	,,	500–250			
		50	15·75	35·30	26·04	8·32	25	—	,,	750–500	—	1745	
		60	15·74	35·30	26·04	8·31	26	5·19	N 70 B	128–0	1757	1819	KT
		80	15·53	35·30	26·09	8·31	26	—	N 100 B				
		100	13·73	35·12	26·35	8·22	41	4·68					
		150	12·81	35·05	26·48	8·17							
		200	11·76	34·98	26·63	8·15	—	4·62					
		300	10·01	34·79	26·80	8·12							
		400	7·86	34·61	27·01	8·06	—	4·08					
		600	4·46	34·35	27·24	8·03	—	4·43					
		800	3·64	34·42	27·38	8·00	—	4·27					
		1000	3·21	34·52	27·50	8·00	—	3·89					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
411	33° 03′ S, 16° 15½′ E to 33° 03′ S, 16° 13′ E	1930 20 viii	2020	2264 w. Cl. Gl.	SSW	15	SSW	3	o.	1022·6	14·0	10·8	mod. SSW swell
			2355	—	S × W	19	S × W	2	b. c.	1023·3	13·5	11·0	,,
412	33° 03′ S, 15° 50′ E to 33° 03′ S, 15° 48′ E	21 viii	0145	2931 h.	SSW	13	SSW	2	b. c.	1023·4	13·0	10·6	mod. SSW swell
			0557	—	S	10	S	2	o.	1023·2	13·2	10·5	,,
413	33° 13′ S, 15° 46½′ E	21 viii	1300	—	SSE	10	S × E	3	c.	1022·2	14·6	11·5	mod. S swell
			2130	—	S	7	S	2	b.	1022·8	14·5	12·5	,,
414	40° 28′ S, 16° 52′ E to 40° 28′ S, 16° 56′ E	28 viii	1315	4943 h.	NE × N	18	NE × N	4	c.	1018·1	11·0	8·7	mod. conf. SW swell
			2208	—	NE	14	NE	3	o. r.	1014·2	11·2	11·0	mod. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
411	26	0	15·72	35·31	26·06	8·32	20	—	**N 50 V**	100–0	**2025**		
		10	15·74	35·31	26·05	8·32	20	—	**N 70 V**	50–0			
		20	15·74	35·31	26·05	8·32	24	—	,,	100–50			
		30	15·74	35·31	26·05	8·32	21	—	,,	250–100			
		40	15·75	35·31	26·05	8·32	20	—	,,	500–250			
		50	15·74	35·31	26·05	8·32	23	—	,,	750–500			
		60	15·74	35·31	26·05	8·32	25	—	,,	1000–750	—	**2315**	
		80	15·65	35·31	26·07	8·31	27	—	**N 70 B**	130–0	**2326**	**2346**	KT
		100	13·69	35·08	26·32	8·23	41	—	**N 100 B**				
		150	12·42	35·05	26·56	8·18							
		200	11·44	34·98	26·69	8·14							
		300	9·20	34·64	26·82	8·11							
		400	7·78	34·56	26·98	8·09							
		600	4·57	34·34	27·22	8·07							
		800	3·56	34·39	27·37	8·04							
		1000	3·11	34·49	27·49	8·04							
		1500	2·94	34·76	27·72	8·04							
		2000	2·92	34·84	27·79	8·04							
412	26	0	16·17	35·35	25·98	8·32	23	4·81	**N 50 V**	100–0	**0153**		
		10	16·17	35·34	25·98	8·32	23	—	**N 70 V**	50–0			
		20	16·17	35·34	25·98	8·32	24	4·84	,,	100–50			
		30	16·17	35·34	25·98	8·32	23	—	,,	250–100			
		40	16·13	35·32	25·97	8·32	23	4·79	,,	500–250			
		50	15·43	35·26	26·08	8·32	23	—	,,	750–500	—	**0525**	
		60	15·32	35·21	26·07	8·30	33	4·54	**N 70 B**	113–0	**0537**	**0557**	KT
		80	14·22	35·08	26·21	8·28	39	—	**N 100 B**				
		100	13·67	35·08	26·43	8·19	46	4·19					
		150	12·55	35·08	26·55	8·17							
		200	11·50	34·91	26·62	8·15	—	4·32					
		300	9·45	34·70	26·82	8·09							
		400	7·38	34·50	26·99	8·03	—	4·05					
		600	4·44	34·31	27·21	8·03	—	4·27					
		800	3·54	34·36	27·34	8·02	—	3·83					
		1000	3·12	34·46	27·46	8·03	—	3·61					
		1500	2·82	34·70	27·68	8·02	—	4·02					
		2000	2·81	34·82	27·78	8·03	—	4·59					
		2500	2·61	34·83	27·80	8·03	—	4·70					
413	27	—	—	—	—	—	—	—	**TYFB**	1600–1000	1428	1600	DGP
									,,	2200–1600 (–0)	1428	1608	,,
									,,	550–350	1735	**1905**	,,
									,,	350–0	**1951**	**2120**	,,
414	4	0	12·11	34·80	26·42	8·28	58	5·60	**N 50 V**	100–0	1327		
		10	12·09	34·80	26·43	8·28	60	—	**N 70 V**	50–0			
		20	12·05	34·79	26·43	8·28	60	5·57	,,	100–50			
		30	12·04	34·79	26·43	8·29	59	—	,,	250–100			
		40	12·02	34·78	26·43	8·28	60	5·66	,,	500–250			
		50	12·01	34·78	26·43	8·27	60	—	,,	750–500			
		60	11·64	34·78	26·50	8·27	60	5·55	,,	1000–750			
		80	10·94	34·69	26·56	8·26	68	—	,,	1500–1000	—	1610	
		100	10·90	34·65	26·54	8·24	71	5·68	**N 70 B**	111–0	1750	1810	KT
		150	10·54	34·60	26·56	8·23	64	—	**N 100 B**				
		200	10·23	34·53	26·56	8·22	88	5·66	**N 100 B**	1700–1000	**1915**	**1958**	DGP
		300	9·11	34·58	26·79	8·16	94						
		400	8·69	34·64	26·90	8·13	98	4·62					
		600	5·53	34·40	27·15	8·11	116	3·67					
		800	4·68	34·46	27·30	8·04	167	4·49					
		1000	3·69	34·52	27·46	8·00	167						
		1500	2·84	34·67	27·66	7·98	152	3·78					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
414 *cont.*	40° 28′ S, 16° 52′ E to 40° 28′ S, 16° 56′ E	1930 28 viii											
415	39° 39½′ S, 17° 08½′ E to 39° 40½′ S, 17° 13½′ E	29 viii	0158	4197 h.	NW × N	20	NW	5	c. p.	1011·8	14·0	13·0	mod. N swell
			0645	—	SSW	10	SSW	2	o. c.	1014·3	11·5	11·0	mod. conf. swell
416	38° 53′ S, 17° 35½′ E to 38° 49½′ S, 17° 33¾′ E	29 viii	1045	5341 rd. Cl. S.	SSW	7	SSW	2	o.	1017·9	13·0	11·7	mod. conf. swell
			1630	—	SSW	4	conf.	2	o.	1018·7	13·8	11·6	,,
417	38° 09′ S, 17° 45½′ E	29–30 viii	2035	4778 rd. Cl. S.	ENE	13	E	2	b. c. p.	1019·0	14·0	13·5	mod. conf. swell
			0135	—	NW × N	10	NW × N	2	b. c. p.	1019·3	15·4	14·0	mod. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
414 *cont.*		2000	2·74	34·79	27·76	7·99	143						
		2500	2·49	34·83	27·82	8·16	136	4·62					
		3000	2·24	34·84	27·84	8·14	126						
		3500	1·81	34·82	27·86	8·16	126	4·68					
		4000	1·11	34·76	27·87	8·15	132						
		4500	0·94	34·72	27·85	8·16	136	4·60					
415	5	0	11·30	34·64	26·45	8·27	58	5·84	**N 70 B**	158–0	**0217**	**0235**	KT
		10	11·28	34·65	26·46	8·27	59	—	**N 100 B**				
		20	11·24	34·65	26·47	8·27	59	5·79	**N 50 V**	100–0	**0300**		
		30	11·16	34·65	26·49	8·27	59	—	**N 70 V**	50–0			
		40	11·10	34·64	26·49	8·27	59	5·83	,,	100–50			
		50	10·92	34·64	26·52	8·26	69	—	,,	250–100			
		60	10·88	34·64	26·53	8·26	70	5·79	,,	500–250			
		80	10·80	34·64	26·54	8·25	74	—	,,	750–600			
		100	10·72	34·61	26·54	8·25	74	5·82	,,	1000–750	—	0634	
		150	10·70	34·61	26·54	8·25	74						
		200	10·62	34·61	26·55	8·24	76	5·74					
		300	9·34	34·60	26·76	8·16	86						
		400	7·99	34·53	26·92	8·12	104	4·84					
		600	4·96	34·48	27·29	8·10	114	5·00					
		800	3·60	34·26	27·26	8·07	136	4·85					
		1000	2·97	34·33	27·37	8·00	148						
		1500	2·75	34·62	27·62	7·96	152	3·85					
		2000	2·58	34·79	27·78	8·02	139						
		2500	2·48	34·84	27·82	8·12	126	4·59					
		3000	2·34	34·86	27·85	8·12	126						
		3500	1·95	34·82	27·85	8·12	132	4·64					
		4000	1·16	34·78	27·88	8·09	132	4·54					
416	5	0	16·22	35·38	26·00	8·33	31	5·25	**N 50 V**	100–0	1051		
		10	16·22	35·38	26·00	8·33	31	—	**N 70 V**	50–0			
		20	16·16	35·38	26·01	8·33	31	4·95	,,	100–50			
		30	16·13	35·38	26·02	8·33	33	—	,,	250–100			
		40	15·86	35·35	26·06	8·33	34	4·98	,,	500–250			
		50	15·82	35·35	26·06	8·33	36	—	,,	750–500			
		60	15·66	35·28	26·05	8·31	37	5·00	,,	1000–750			
		80	15·53	35·26	26·06	8·31	37	—	,,	1500–1000	—	1353	
		100	13·72	34·99	26·25	8·28	46	4·92	**N 70 B**	110–0	1603	1623	KT
		150	13·26	34·99	26·35	8·23	69	—	**N 100 B**				
		200	12·14	34·88	26·48	8·21	69	5·00					
		300	9·78	34·52	26·63	8·16	108						
		400	8·90	34·55	26·80	8·11	108	5·03					
		600	5·94	34·30	27·02	8·10	134	4·76					
		800	4·05	34·29	27·24	8·05	141	4·89					
		1000	3·48	34·36	27·35	8·02	146						
		1500	2·91	34·66	27·64	7·96	150	3·73					
		2000	2·67	34·74	27·73	8·04	165						
		2500	2·54	34·85	27·83	8·05	146	4·60					
		3000	2·44	34·85	27·83	8·13	130						
		3500	2·24	34·81	27·82	8·16	127	4·38					
		4000	1·67	34·79	27·85	8·14	130						
		4500	1·04	34·76	27·87	8·15	146	4·32					
		5000	0·97	34·76	27·88	8·13	155	4·38					
417	5	0	15·62	35·26	26·04	8·34	49	5·33	**N 70 B**	110–0	**2046**	**2106**	KT
		10	15·53	35·26	26·06	8·34	49	—	**N 100 B**				
		20	15·53	35·26	26·06	8·34	50	5·22	**N 50 V**	100–0	**2116**		
		30	15·51	35·26	26·06	8·33	58	—	**N 70 V**	50–0			
		40	15·43	35·26	26·08	8·33	58	5·19	,,	100–50			
		50	15·16	35·23	26·12	8·33	56	—	,,	250–100			
		60	15·02	35·17	26·11	8·32	56	5·22	,,	500–250			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
417 *cont.*	38° 09′ S, 17° 45½′ E	1930 29–30 viii											
418	37° 25′ S, 17° 56½′ E	30 viii	0547	4565 h.	N × W	9	NNW	1	c. r.	1019·1	15·0	14·0	mod. WSW swell
			1033	—	NNW	6	—	1	b. c.	1019·3	15·5	13·5	„
419	36° 29′ S, 18° 16¼′ E to 36° 29′ S, 18° 15¼′ E	30 viii	1533	4170 gl. Oz. sm. St.	NW × N	7	—	0–1	c.	1016·9	16·0	14·5	mod. conf. NW swell
			1951	—	NNW	9	NNW	1	c.	1016·7	15·7	13·8	mod. WNW swell

Station	Age of moon (days)	Hydrological observations: Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Biological observations: Gear	Depth (metres)	Time: From	To	Remarks
417 *cont.*	5	80	14·80	35·09	26·09	8·31	60	—	**N 70 V**	750–500			
		100	13·72	34·91	26·19	8·28	64	5·19	,,	1000–750			
		150	12·11	34·70	26·35	8·24	66	—	,,	1500–1000	—	**0031**	
		200	10·96	34·62	26·50	8·18	74	5·03					
		300	9·60	34·59	26·71	8·13	82						
		400	7·98	34·56	26·95	8·09	99	4·65					
		600	5·07	34·28	27·17	8·08	112	4·62					
		800	3·84	34·30	27·29	8·03	130	4·46					
		1000	3·42	34·39	27·38	7·99	141						
		1500	2·72	34·65	27·65	7·99	146	4·43					
		2000	2·63	34·74	27·73	8·04	141						
		2500	2·44	34·75	27·76	8·10	130	4·40					
		3000	2·24	34·79	27·80	8·10	127						
		3500	1·77	34·73	27·80	8·12	127	4·57					
		4000	1·13	34·69	27·81	8·12	130						
		4500	0·92	34·68	27·82	8·07	141	4·46					
418	6	0	15·96	35·27	25·97	8·34	50	5·19	**N 70 B**	107–0	**0613**	**0633**	KT
		10	15·96	35·27	25·97	8·34	50	—	**N 100 B**				
		20	15·96	35·27	25·97	8·34	50	4·95	**N 50 V**	100–0	0652		
		30	15·96	35·27	25·97	8·34	50	—	**N 70 V**	50–0			
		40	15·72	35·25	26·01	8·34	53	—	,,	100–50			
		50	15·43	35·17	26·01	8·34	53	—	,,	250–100			
		60	15·02	35·11	26·06	8·33	53	5·25	,,	500–250			
		80	14·32	35·00	26·13	8·32	55	—	,,	750–500			
		100	13·70	34·94	26·21	8·27	60	5·17	,,	1000–750			
		150	12·32	34·76	26·35	8·24	60	—	,,	1500–1000	—	0958	
		200	11·91	34·83	26·49	8·20	78	5·00					
		300	11·50	34·95	26·66	8·15	92						
		400	8·90	34·60	26·84	8·10	112	4·40					
		600	5·66	34·41	27·15	8·06	141	4·11					
		800	4·21	34·35	27·27	—	141	4·32					
		1000	3·35	34·40	27·39	7·99	141						
		1500	2·73	34·64	27·64	7·98	146	3·86					
		2000	2·58	34·76	27·75	8·01	134						
		2500	2·49	34·80	27·79	8·09	127	4·57					
		3000	2·19	34·80	27·82	8·11	124						
		3500	1·66	34·78	27·84	8·10	124	4·62					
		4000	1·05	34·72	27·84	8·09	141						
		4500	0·77	34·70	27·84	8·03	146	4·57					
419	6	0	17·60	35·43	25·70	8·33	34	4·89	**N 50 V**	100–0	1530		TD 18 m. Light Penetration
		10	17·42	35·42	25·73	8·33	34	—	**N 70 V**	50–0			
		20	17·38	35·42	25·75	8·33	40	4·95	,,	100–50			
		30	17·35	35·41	25·75	8·33	43	—	,,	250–100			
		40	17·32	35·41	25·75	8·33	44	4·84	,,	500–250			
		50	17·22	35·38	25·75	8·33	44	—	,,	750–500			
		60	17·19	35·38	25·76	8·33	44	4·87	,,	1000–750	—	**1920**	
		80	17·05	35·37	25·79	8·33	44	—	**N 70 B**	84–0	**1928**	**1948**	KT
		100	17·02	35·37	25·79	8·31	45	4·92	**N 100 B**				
		150	16·52	35·36	25·91	8·30	55						
		200	15·64	35·23	26·01	8·30	56	4·89					
		300	13·39	35·12	26·42	8·22	68						
		400	11·85	34·97	26·61	8·16	92	4·79					
		600	7·82	34·58	26·99	8·12	120	4·38					
		800	4·68	34·26	27·15	8·08	146	4·89					
		1000	3·95	34·37	27·31	8·00	149						
		1500	2·83	34·60	27·60	7·96	149	3·75					
		2000	2·81	34·76	27·73	8·03	149						
		2500	2·74	34·85	27·81	8·11	140	4·62					
		3000	2·50	34·86	27·84	8·11	130						
		3500	2·32	34·84	27·84	8·12	133	4·87					
		4000	1·38	34·80	27·88	8·12	145	4·79					

Hour 1540–1740	
Depth	ccs. of N/10 uranyl oxalate decomposed per hour
0	2·46
1	0·91
5	0·67
10	0·46
15	0·21
20	0·18
25	0·07
30	0·05
35	0·02
40	0·02
45	0·02

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
420	$35^\circ\ 35'$ S, $18^\circ\ 25\frac{1}{4}'$ E	1930 31 viii	0051	2474 gn. y. M.	W	2	—	0	b. c.	1017·3	15·6	14·0	mod. WSW swell
			0351	—	SW × W	18	SW × W	2	b. c.	1017·6	14·8	14·3	mod. conf. swell
421	$34^\circ\ 42\frac{1}{2}'$ S, $18^\circ\ 39'$ E	31 viii	0830	180	W	10	W	2	c. d.	1020·1	14·2	13·8	slight conf. W swell
422	$34^\circ\ 53\frac{1}{2}'$ S, $20^\circ\ 15\frac{1}{2}'$ E	2 ix	2130	90*	W	20	W	4	b.	1008·4	15·0	12·8	mod. W swell
423	$34^\circ\ 27\frac{1}{2}'$ S, $25^\circ\ 04\frac{1}{2}'$ E	3 ix	2130	117*	NE	19	NE	3	b. c.	1004·0	15·2	13·0	mod. to heavy WSW swell
424	$34^\circ\ 15\frac{1}{4}'$ S, $25^\circ\ 58\frac{1}{2}'$ E	4 ix	0235	119	NNW	14	NNW	2	b.	1003·7	16·0	14·0	mod. conf. swell
425	$34^\circ\ 50'$ S, $26^\circ\ 41\frac{1}{2}'$ E to $34^\circ\ 53\frac{3}{4}'$ S, $26^\circ\ 30\frac{1}{2}'$ E	4 ix	0815	4106 gl. Oz. f. S.	W	24	W	5	c.	1003·6	20·5	14·7	heavy W swell
			1200	—	W	24	W	4	c.	1005·8	17·8	15·0	v. heavy WSW swell
			1620	—	SW × W	30	SW × W	5	c. g.	1005·7	16·7	14·2	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
420	7	0	16·48	35·32	25·89	8·32	35	4·89	**N 70 B**	106–0	**0104**	**0124**	KT
		10	16·46	35·32	25·89	8·33	43	—	**N 100 B**				
		20	16·44	35·32	25·89	8·32	53	4·84	**N 50 V**	100–0	**0130**		
		30	16·42	35·32	25·90	8·33	56	—	**N 70 V**	50–0			
		40	15·92	35·26	25·97	8·32	62	4·92	,,	100–50			
		50	15·56	35·23	26·03	8·31	62	—	,,	250–100			
		60	15·48	35·21	26·03	8·31	62	4·95	,,	500–250			
		80	14·57	35·13	26·17	8·26	73	—	,,	750–500			
		100	13·94	35·10	26·28	8·24	80	4·35	,,	1000–750	—	**0350**	
		150	12·41	35·09	26·59	8·18	82						
		200	10·61	34·85	26·74	8·14	126	4·38					
		300	8·50	34·61	26·91	8·05	133						
		400	6·98	34·51	27·05	8·03	141	4·32					
		600	4·76	34·36	27·21	8·02	154	4·24					
		800	3·92	34·43	27·36	8·03	154	4·16					
		1000	3·30	34·46	27·45	7·98	159						
		1500	2·84	34·74	27·71	7·98	154	4·35					
		2000	2·81	34·84	27·80	8·02	154	4·65					
421	7	0	15·13	35·29	26·18	8·32	51	5·38	**N 50 V**	100–0	0835		
		10	15·12	35·29	26·18	8·32	51	—	**N 70 V**	50–0			
		20	14·44	35·19	26·25	8·30	52	5·36	,,	100–50			
		30	14·39	35·19	26·26	8·29	60	—	,,	150–100	—	0917	
		40	14·24	35·19	26·29	8·26	64	5·36	**N 70 B**	77–0	0930	0950	KT
		50	14·17	35·19	26·31	8·24	65	—	**N 100 B**				
		60	14·07	35·19	26·33	8·23	71	5·19					
		80	14·02	35·19	26·34	8·23	73						
		100	10·79	34·90	26·75	8·11	113	5·86					
		150	9·12	34·71	26·88	7·99	121	3·34					
422	9	0	14·65	35·35	26·33	—	—	—	**N 70 B**	86–0	**2143**	**2203**	KT
									N 100 B				
423	11	0	16·90	35·35	25·81	—	—	—	**N 70 B**	56–0	**2139**	**2159**	KT
									N 100 B				
424	11	0	17·11	35·34	25·75	8·33	49	5·00	**N 70 B**	59–0	**0237**	**0258**	KT
		10	17·11	35·34	25·75	8·33	52	—	**N 100 B**				
		20	17·11	35·34	25·75	8·33	47	5·01	**N 50 V**	100–0	**0307**		
		30	17·10	35·34	25·75	8·33	47	—	**N 70 V**	50–0			
		40	17·04	35·34	25·76	8·32	49	4·93	,,	100–50	—	**0332**	
		50	16·97	35·31	25·76	8·31	49						
		60	16·24	35·29	25·92	8·29	52	4·36					
		80	15·13	35·26	26·15	8·22	78						
		100	13·28	35·09	26·42	8·13	87	3·85					
425	11	0	21·09	35·41	24·79	8·34	26	4·70	**N 50 V**	100–0	0827		
		10	21·11	35·41	24·78	8·34	26	—	**N 70 V**	50–0			
		20	21·11	35·41	24·78	8·34	26	4·71	,,	100–50			
		30	21·11	35·41	24·78	8·34	26	—	,,	250–100			
		40	21·11	35·41	24·78	8·34	26	4·70	,,	500–250			
		50	21·11	35·41	24·78	8·34	32	—	,,	750–500	—	1134	
		60	21·06	35·41	24·79	8·34	27	4·67					
		80	20·91	35·41	24·83	8·34	27						
		100	20·11	35·46	25·08	8·33	27	4·79					
		150	18·66	35·52	25·50	8·32	30						
		200	17·81	35·53	25·72	8·32	30	4·71					
		300	16·25	35·53	26·10	8·27	55						
		400	14·42	35·43	26·44	8·18	52	4·23					
		600	11·76	35·12	26·74	8·19	77	4·27					
		800	9·64	34·85	26·91	8·13	104	4·47					
		1000	8·20	34·72	27·04	8·10	114						

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
425 *cont.*	34° 50′ S, 26° 41½′ E to 34° 53¾′ S, 26° 30½′ E	1930 4 ix											
426	34° 58′ S, 26° 22½′ E	4 ix	2130	—	W	24	conf.	4	o. r.	1007·9	15·5	14·0	v. heavy conf. W swell
427	36° 37′ S, 28° 48′ E to 36° 38′ S, 28° 56′ E	7 ix	0800	4951 gy. Oz.	SW	9	SW	2	c.	1026·7	12·2	8·5	heavy SW swell
			1340	—	SSE	5	conf.	3	b.	1024·3	15·0	13·5	mod. SSW swell
428	37° 14½′ S, 29° 34¼′ E to 37° 13′ S, 29° 35¾′ E	7 ix	1750	4777	N	10	N	1–2	b.	1022·9	13·2	9·2	mod. SW swell
			2235	—	N	20	N	4	b. c.	1021·7	14·6	11·5	mod. v. conf. swell
429	37° 47½′ S, 30° 14½′ E	8 ix	0235	4696	NNW	22	NNW	4	c.	1017·9	15·2	12·4	mod. v. conf. swell
430	41° 14′ S, 34° 55½′ E	9 ix	0500	—	NW × W	17	NW × W	4	o. p.	1002·7	14·7	12·1	conf. NW × W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
425 *cont.*	11	1500	4·12	34·72	27·57	8·04	157	3·04					
		2000	2·76										
		2500	2·61	34·79	27·77	7·97	143	4·05					
		3000	2·40	34·83	27·82	8·11	143						
		3500	2·03	34·82	27·85	8·12	145	4·43					
		4000	1·44	34·79	27·87	8·00	139	4·52					
426	12	0	20·40	35·53	25·06	—	—	—	**N 70 B**	161–0	**2138**	**2158**	KT
									N 100 B				
427	14	0	18·01	35·48	25·64	8·36	31	4·94	**N 50 V**	100–0	0800	—	Two hauls
		10	18·02	35·48	25·64	8·36	29	—	**N 70 V**	50–0			
		20	18·03	35·48	25·63	8·36	31	4·88	,,	100–50			
		30	18·03	35·48	25·63	8·36	31	—	,,	250–100			
		40	18·03	35·48	25·63	8·36	31	4·90	,,	500–250			
		50	18·03	35·48	25·63	8·36	31	—	,,	750–500			
		60	18·03	35·48	25·63	8·36	31	5·00	,,	1000–750	—	1230	
		80	18·02	35·48	25·64	8·36	29	—	**N 70 B**	170–0	1318	1338	KT
		100	18·01	35·48	25·64	8·35	31	4·91	**N 100 B**				
		150	17·81	35·48	25·69	8·33	31						
		200	17·75	35·48	25·70	8·33	34	4·59					
		300	16·57	35·52	26·02	8·30	41						
		400	15·10	35·44	26·30	8·28	57	4·39					
		600	12·67	35·21	26·63	8·25	74	4·21					
		800	10·61	34·96	26·83	8·21	97	4·41					
		1000	8·20	34·66	26·99	8·13	133						
		1500	3·64	34·44	27·40	8·00	153	3·88					
		2000	2·81	34·70	27·68	7·95	158						
		2500	2·64	34·79	27·77	8·12	149	4·23					
		3000	2·35	34·84	27·84	8·13	149						
		3500	2·02	34·83	27·86	8·11	149	4·49					
		4000	1·44	34·78	27·86	8·04	158						
		4500	1·28	34·76	27·86	8·09	153	4·44					
428	15	0	18·36	35·50	25·57	8·34	—	4·97	**N 50 V**	100–0	**1755**		
		10	18·11	35·50	25·62	8·34	—	—	**N 70 V**	50–0			
		20	18·11	35·50	25·62	8·34	—	5·19	,,	100–50			
		30	18·03	35·50	25·65	8·34	—	—	,,	250–100			
		40	18·03	35·50	25·65	8·34	—	5·00	,,	500–250			
		50	18·01	35·50	25·65	8·34	—	—	,,	750–500			
		60	18·01	35·50	25·65	8·34	—	4·92	,,	1000–750	—	**2010**	
		80	17·96	35·50	25·66	8·34	—	—	**N 70 B**	104–0	**2217**	**2237**	KT
		100	17·92	35·50	25·67	8·33	—	4·96	**N 100 B**				
		150	17·89	35·50	25·68	8·31							
		200	17·71	35·48	25·71	8·31	—	4·66					
		300	16·59	35·50	26·00	8·30							
		400	15·01	35·42	26·30	8·26	—	4·24					
		600	12·73	35·23	26·64	8·22	—	4·47					
		800	10·26	34·88	26·83	8·19	—	4·50					
		1000	8·01	34·66	27·02	8·10							
		1500	3·57	34·51	27·46	7·95	—	3·77					
		2000	2·75	34·70	27·69	7·95							
		2500	2·66	34·79	27·77	8·06	—	4·36					
		3000	2·36	34·84	27·83	8·07							
		3500	2·04	34·83	27·85	8·06	—	4·58					
		4000	1·55	34·79	27·86	8·05							
		4500	1·22	34·76	27·86	8·01	—	4·61					
429	15	0	18·61	35·53	25·52	—	—	—	**N 70 B**	82–0	**0256**	**0316**	KT
		400	15·62	—	—	—	—	—	**N 100 B**				
430	16	—	—	—	—	—	—	—	**N 70 B**	75–0	**0516**	**0536**	KT
									N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
431	41° 59½′ S, 35° 58¾′ E to 41° 56¼′ S, 35° 54¾′ E	1930 9 ix	1100	5033	SSW	15	SSW	3	o.	1003·3	9·7	8·5	heavy conf. WNW swell
			1702	—	SW × W	13	conf.	3	o. d. g.	1003·0	9·3	8·5	heavy conf. swell
432	40° 49′ S, 34° 37′ E to 40° 46¾′ S, 34° 36¼′ E	10 ix	0433	4588	WSW	19	WSW	3	b.	1010·7	8·4	5·5	heavy W swell
			1110	—	SW × W	32	SW × W	4	b.	1012·7	10·0	6·5	heavy conf. WSW swell
433	39° 37′ S, 33° 04′ E to 39° 38′ S, 33° 08′ E	10–11 ix	2230	4034*	SW × W	22	SW × W	3	c.	1020·7	10·4	10·2	heavy conf. WSW swell
			0320	—	SSW	19	SW × W	3	b. c.	1019·8	10·1	10·1	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
431	16	0	11·61	34·84	26·55	8·28	56	5·67	**N 50 V**	100–0	1117		
		10	11·59	34·84	26·56	8·28	55	—	**N 70 V**	50–0			
		20	11·59	34·84	26·56	8·28	56	5·75	,,	100–50			
		30	11·59	34·84	26·56	8·28	56	—	,,	250–100			
		40	11·59	34·84	26·56	8·28	56	5·79	,,	500–250			
		50	11·59	34·84	26·56	8·28	54	—	,,	750–500			
		60	11·57	34·84	26·56	8·28	54	5·81	,,	1000–750	—	1358	
		80	11·20	34·81	26·61	8·26	54	—	**TYFB**	550–0	1603	1703	DGB
		100	9·99	34·63	26·68	8·22	60	5·63					
		150	8·41	34·38	26·74	8·17	74						
		200	9·19	34·54	26·74	8·17	71	5·51					
		300	9·17	34·64	26·82	8·09	76						
		400	6·62	34·38	27·00	8·06	90	5·00					
		600	5·30	34·38	27·17	8·05	114	4·80					
		800	4·07	34·37	27·30	8·04	134	4·34					
		1000	3·42	34·48	27·45	7·97	148						
		1500	2·84	34·69	27·67	7·93	148	3·92					
		2000	2·57	34·76	27·75	8·01	128						
		2500	2·50	34·83	27·82	8·08	128	4·55					
		3000	2·10	34·83	27·85	8·08	128						
		3500	1·59	34·81	27·87	8·04	128	4·90					
		4000	1·11	34·78	27·88	8·07	130						
		4500	0·86	34·75	27·88	8·07	130	4·40					
432	17	0	13·19	35·05	26·40	8·29	35	5·47	**N 70 B**	130–0	**0432**	**0445**	KT
		10	13·19	35·04	26·40	8·30	35	—	**N 100 B**				
		20	13·20	35·04	26·39	8·30	35	5·42	**N 50 V**	100–0	**0520**		
		30	13·20	35·04	26·39	8·30	35	—	**N 70 V**	50–0			
		40	13·19	35·05	26·40	8·30	35	5·42	,,	100–50			
		50	13·19	35·05	26·40	8·30	35	—	,,	250–100			
		60	13·19	35·05	26·40	8·30	40	6·02	,,	500–250			
		80	13·19	35·05	26·40	8·30	52	—	,,	750–500			
		100	13·21	35·04	26·39	8·30	52	5·53	,,	1000–750	—	0745	
		150	12·99	35·02	26·42	8·28	52						
		200	11·91	34·94	26·57	8·22	64	5·26					
		300	10·97	34·92	26·73	8·18	77						
		400	9·71	34·78	26·84	8·16	87	4·73					
		600	7·12	34·56	27·07	8·11	110	4·34					
		800	5·07	34·42	27·23	8·10	126	4·41					
		1000	4·06	34·44	27·35	7·98	130						
		1500	2·98	34·63	27·61	8·02	143	3·55					
		2000	2·66	34·75	27·74	8·02	137						
		2500	2·48	34·81	27·80	8·10	120	4·92					
		3000	2·20	34·81	27·82	8·11	120						
		3500	2·10	34·80	27·82	8·11	121						
		4000	1·59	34·78	27·85	8·08	121	5·02					
433	18	0	17·21	35·49	25·84	8·34	33	5·02	**N 70 B**	93–0	**2248**	**2309**	KT
		10	17·23	35·49	25·84	8·34	33	—	**N 100 B**				
		20	17·23	35·48	25·83	8·34	33	5·02	**N 50 V**	100–0	**2322**		
		30	17·23	35·48	25·83	8·34	33	—	**N 70 V**	50–0			
		40	17·23	35·48	25·83	8·34	33	5·04	,,	100–50			
		50	17·23	35·48	25·83	8·34	33	—	,,	250–100			
		60	17·23	35·48	25·83	8·33	33	5·27	,,	500–250			
		80	17·23	35·48	25·83	8·32	33	—	,,	750–500			
		100	17·11	35·48	25·85	8·32	33	5·04	,,	1000–750	—	**0215**	
		150	16·62	35·49	25·98	8·30	33						
		200	15·73	35·43	26·15	8·26	47	4·23					
		300	13·35	35·12	26·42	8·25	52						
		400	11·80	34·87	26·54	8·19	50	4·89					
		600	9·11	34·72	26·90	8·14	74	4·51					
		800	6·23	34·51	27·15	8·06	113	4·39					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. °C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
433 *cont.*	39° 37′ S, 33° 04′ E to 39° 38′ S, 33° 08′ E	1930 10–11 ix											
434	38° 27¾′ S, 31° 25′ E to 38° 27½′ S, 31° 31′ E	11 ix	1500	4312	—	0–1	—	1	b.	1022·7	12·5	8·5	mod. SW swell
			1853	—	—	0–1	—	1	b.	1023·6	12·5	9·0	,,
435	35° 43¾′ S, 27° 44½′ E to 35° 50¼′ S, 27° 54′ E	12–13 ix	2330	4702*	W	19	conf.	3	c.	1004·1	18·5	18·5	mod. conf. swell
			0343	—	W	30	W	3	c. p.	1003·8	18·0	17·0	mod. W swell
436	29° 55¾′ S, 31° 26¾′ E	20 ix	1300	417	NE E	25	NE E	4	b.	1020·2	19·0	15·5	slight S E swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
433 *cont.*	18	1000	4·45	34·42	27·30	8·00	150						
		1500	3·29	34·59	27·55	7·97	150	3·63					
		2000	3·06	34·76	27·71	8·02	150	3·87					
		2500	2·73	34·78	27·75	8·06	136						
		3000	2·56	34·85	27·82	8·10	126						
		3500	2·36	34·81	27·81	8·08	128	4·56					
434	18	0	14·86	35·23	26·19	8·28	36	—	N 50 V	100–0	1503	—	TD 20
		10	14·62	35·22	26·23	8·28	36	—	N 70 V	50–0			
		20	14·47	35·18	26·24	8·28	36	5·38	,,	100–50			
		30	14·41	35·18	26·25	8·29	36	—	,,	250–100			
		40	14·34	35·17	26·25	8·28	36	5·31	,,	500–250			
		50	14·31	35·17	26·26	8·27	36	—	,,	750–500			
		60	14·21	35·16	26·27	8·27	36	5·41	,,	1000–750			
		80	13·92	35·12	26·30	8·27	36	—	,,	1500–850	—	1801	
		100	13·42	35·06	26·36	8·27	40	5·46	N 70 B	135–0	1832	**1852**	KT
		150	12·45	34·94	26·47	8·19	69	—	N 100 B				
		200	12·02	34·90	26·52	8·17	71	4·13					
		300	11·08	34·88	26·68	8·14	78						
		400	9·80	34·82	26·86	8·10	78	4·69					
		600	7·09	34·54	27·06	8·03	112	4·41					
		800	5·16	34·44	27·23	7·95	136	4·55					
		1000	4·08	34·44	27·35	7·94	157						
		1500	3·10	34·56	27·55	7·93	152	3·62					
		2000	2·70	34·77	27·75	7·93	139						
		2500	2·54	34·81	27·79	7·97	128	4·54					
		3000	2·32	34·83	27·83	8·04	128						
		3500	1·98	34·80	27·84	8·04	122	4·56					
435	20	0	19·11	35·48	25·36	8·33	35	—	N 50 V	100–0	**2337**		
		10	19·09	35·48	25·37	8·32	35	—	N 70 V	50–0			
		20	18·70	35·46	25·45	8·32	35	—	,,	100–50			
		30	18·65	35·46	25·46	8·32	27	—	,,	250–100			
		40	18·63	35·45	25·46	8·32	27	—	,,	500–250			
		50	18·61	35·45	25·46	8·31	27	—	,,	750–500			
		60	18·61	35·46	25·47	8·31	27	—	,,	1000–750	—	**0247**	
		80	18·58	35·45	25·47	8·31	27	—	N 70 B	86–0	**0326**	**0341**	KT
		100	18·51	35·46	25·50	8·31	27	—	N 100 B				
		150	17·79	35·46	25·67	8·26	38						
		200	17·51	35·48	25·76	8·25	38						
		300	16·03	35·52	26·15	8·23	47						
		400	14·37	35·39	26·42	8·18	47						
		600	12·47	35·17	26·64	8·17	48						
		800	10·20	34·85	26·81	8·15	90						
		1000	8·06	34·66	27·01	8·05	90						
		1500	4·01	34·56	27·46	7·92	141						
		2000	2·85	34·69	27·67	7·93	136						
		2500	2·69	34·81	27·78	8·06	130						
		3000	2·40	34·84	27·83	8·04	128						
		3500	2·15	34·85	27·86	8·04	128						
		4000	1·69	34·80	27·86	8·03	130						
		4500	1·35	34·78	27·87	8·04	131						
436	27	0	20·87	35·41	24·84	8·33	21	5·00	N 50 V	100–0	1306		
		10	20·86	35·40	24·84	8·32	21	—	N 70 V	50–0			
		20	20·79	35·40	24·86	8·32	21	4·67	,,	100–50			
		30	20·77	35·41	24·87	8·31	21	—	,,	250–100			
		40	20·75	35·40	24·87	8·32	21	4·59	,,	400–250	—	1402	
		50	20·69	35·40	24·88	8·31	21	—	N 70 B	95–0	1420	1440	KT
		60	20·62	35·40	24·90	8·27	21	4·71	N 100 B				
		80	19·41	35·33	25·17	8·25	22	—	BNR	416 (–0)	1503	1518	
		100	18·17	35·32	25·48	8·22	25	4·18					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
436 *cont.*	29° 55¾′ S, 31° 26¾′ E	1930 20 ix											
437	29° 59′ S, 31° 47′ E	20 ix	1710	889*	NNE	25	NNE	4	b.	1017·5	19·3	16·3	mod. NE swell
438	30° 05½′ S, 32° 05½′ E	20–21 ix	2200	1361*	NNE	31	NNE	5	b.	1015·8	19·5	17·0	slight conf. swell
439	30° 12′ S, 32° 24′ E	21 ix	0420	2526*	N	30	N	4	b.	1010·5	19·5	17·5	conf. N swell
			0724	—	N	25	N	4	b.	1013·2	20·3	19·0	mod. N swell
440	30° 13½′ S, 32° 48½′ E to 30° 25½′ S, 32° 48′ E	21 ix	0945	2220*	NW	13	NW	3	c.	1016·0	21·4	18·8	mod. conf. swell
			1222	—	SSW	30	SSW	4–5	b. c.	1017·4	19·7	17·0	mod. conf. N swell
			1600	—	SSW	26	SSW	4	b. c.	1020·0	19·8	15·5	mod. SW swell

Station	Age of moon (days)	Hydrological observations: Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	Biological observations: Gear	Depth (metres)	Time: From	Time: To	Remarks
436 *cont.*	27	150	15·20	35·29	26·16	8·15							
		200	13·89	35·25	26·41	8·12							
		300	11·83	35·07	26·69	8·07							
		400	10·61	34·92	26·80	8·03	—	3·24					
437	28	0	20·08	35·45	25·08	8·32	16	—	**N 50 V**	100–0	1719		
		10	20·08	35·45	25·08	8·32	16	—	**N 70 V**	50–0			
		20	20·08	35·46	25·09	8·31	16	—	,,	100–50			
		30	20·02	35·45	25·10	8·31	16	—	,,	250–100			
		40	20·02	35·42	25·08	8·32	16	—	,,	500–250			
		50	20·02	35·43	25·09	8·30	16	—	,,	750–500	—	**1850**	
		60	20·02	35·45	25·10	8·30	15	—	**N 100 B**	123–0	**1926**	**1947**	KT
		80	19·93	35·42	25·10	8·30	16						
		100	19·90	35·45	25·13	8·29	16						
		150	18·72	35·45	25·44	8·24							
		200	16·61	35·46	25·97	8·19							
		300	15·17	35·44	26·28	8·16							
		400	12·80	35·26	26·65	8·12							
		600	10·28	34·90	26·84	8·10							
		800	7·57	34·68	27·10	7·99							
438	28	0	20·03	35·42	25·07	8·32	16	4·72	**N 50 V**	100–0	**2212**		
		10	20·04	35·42	25·07	8·32	16	—	**N 70 V**	50–0			
		20	20·04	35·42	25·07	8·32	16	4·96	,,	100–50			
		30	20·04	35·42	25·07	8·32	16	—	,,	250–100			
		40	20·04	35·42	25·07	8·31	16	—	,,	500–250			
		50	20·03	35·42	25·07	8·31	16	—	,,	750–475			
		60	20·03	35·42	25·07	8·31	16	4·42	,,	1000–780	—	**0045**	
		80	20·03	35·42	25·07	8·31	16	—	**N 100 B**	153–0	**0057**	**0117**	KT
		100	20·01	35·42	25·07	8·30	16	3·66?					
		150	18·61	35·46	25·47	8·27							
		200	17·22	35·46	25·81	8·20	—	4·26					
		300	14·91	35·41	26·32	8·18							
		400	14·42	35·34	26·37	8·17	—	4·65					
		600	11·30	35·00	26·73	8·16	—	4·61					
		800	9·52	34·78	26·88	8·08							
		1000	6·95	34·29?	26·88	8·00	—	3·46					
439	28	0	19·62	35·47	25·22	8·33	16	—	**N 70 B**	110–0	**0347**	**0407**	KT
		10	19·63	35·47	25·22	8·33	16	—	**N 100 B**				
		20	19·63	35·48	25·22	8·33	16	—	**N 50 V**	100–0	**0445**		
		30	19·61	35·47	25·22	8·33	15	—	**N 70 V**	50–0			
		40	19·60	35·48	25·23	8·32	18	—	,,	100–50			
		50	19·51	35·48	25·26	8·32	18	—	,,	250–100			
		60	19·47	35·48	25·27	8·31	18	—	,,	500–250			
		80	19·42	35·48	25·28	8·30	18	—	,,	750–500			
		100	18·99	35·48	25·39	8·26	18	—	,,	1000–750	—	0728	
		150	18·09	35·53	25·65	8·25							
		200	17·75	35·53	25·74	8·25							
		300	16·21	35·51	26·09	8·18							
		400	14·33	35·40	26·44	8·13							
		600	12·07	35·17	26·72	8·12							
		800	9·73	34·85	26·89	8·05							
		1000	7·20	34·63	27·12	7·95							
		1500	4·20	34·58	27·45	7·91							
		2000	2·80	34·76	27·73	7·89							
440	28	0	19·64	35·45	25·20	8·31	17	4·91	**N 50 V**	100–0	0950		
		10	19·61	35·46	25·21	8·30	17	—	**N 70 V**	50–0			
		20	19·58	35·46	25·22	8·30	17	4·80	,,	100–50			
		30	19·41	35·46	25·27	8·30	17	—	,,	250–100			
		40	19·32	35·46	25·29	8·30	17	4·99	,,	500–250	—	1145	

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
440 *cont.*	30° 13½′ S, 32° 48½′ E to 30° 25½′ S, 32° 48′ E	1930 21 ix	1915	—	SW × S	17	SW	3	b. c.	1022·6	18·2	14·6	mod. SW swell
441	31° 24′ S, 31° 12′ E	22 ix	0430	—	SE × S	9	—	0–1	c.	1024·5	17·0	12·8	mod. SW swell
442	32° 33′ S, 29° 03¼′ E	22 ix	1830	1514*	SE × E	3	—	1	c.	1026·4	16·7	13·3	heavy SW swell
443	34° 33½′ S, 23° 24′ E	23 ix	2200	106*	E	10	E	2	b. c.	1027·1	16·5	13·7	mod. SSW swell
444	34° 22′ S, 18° 20′ E	24 ix	2100	152*	ESE	24	ESE	4	b.	1020·3	15·2	13·5	mod. ESE swell
445	34° 03½′ S, 18° 00¼′ E	25 ix	0630	212*	ESE	20	ESE	3	b.	1015·3	15·0	13·3	slight SE swell
446	36° 14′ S, 16° 09¾′ E	9 x	2100	—	NW × N	15	conf.	2	o. d.	1003·6	15·0	15·0	mod. conf. E swell
447	37° 22½′ S, 16° 05¼′ E	10 x	0500	—	W × S	30	W × S	4	o. d. q.	998·5	14·5	14·2	mod. conf. swell
448	39° 03′ S, 16° 11¾′ E	10 x	2100	—	W × N	19	W	4	b. c.	1004·7	12·0	11·0	mod. SW swell
449	42° 30½′ S, 15° 14¼′ E	11–12 x	2210	4300	SW	15	SW	3	b. c.	1007·3	7·5	5·0	mod. conf. SW swell
			0149	—	W	7	W	2	o.	1006·7	7·5	5·0	mod. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
440 *cont.*	28	50	19·23	35·46	25·31	8·30	17	—	**TYFH**	950–1050 (–0)	1315	1515	DGB
		60	19·21	35·46	25·32	8·30	17	4·99	**TYFB**	750–150	1720	**1820**	
		80	19·01	35·46	25·37	8·30	19	—	,,	1000–0	1720	**1905**	DGB
		100	18·71	35·49	25·47	8·27	22	4·55					
		150	18·04	35·53	25·67	8·26							
		200	17·40	35·53	25·83	8·24	—	3·81					
		300	15·63	35·51	26·24	8·18							
		400	14·72	35·40	26·35	8·13	—	4·47					
		600	11·84	35·17	26·76	8·12	—	4·75					
		800	9·46	34·85	26·94	8·06	—	4·63					
		1000	7·67	34·63	27·05	8·01							
		1500	4·07	34·60	27·48	7·91	—	3·73					
		2000	1·96?	34·82	27·85	7·92	—	3·80					
441	29	0	19·15	35·52	25·38	—	—	—	**N 70 B** **N 100 B**	180–0	**0440**	**0500**	
442	0	0	20·30	35·45	25·02	—	—	—	**N 70 B** **N 100 B**	164–0	**1841**	**1901**	KT
443	1	0	17·62	35·44	25·70	—	—	—	**N 70 B** **N 100 B**	49–0	**2212**	**2230**	KT
444	2	0	14·40	35·25	26·31	—	—	—	**N 70 B** **N 100 B**	80–0	**2111**	**2132**	KT
445	3	0	14·20	35·34	26·42	—	—	—	**TYFV**	150–0	0638	0640	
446	17	0	15·35	35·28	26·12	—	—	—	**N 70 B** **N 100 B**	106–0	**2119**	**2140**	KT
447	18	0	16·12	35·52	26·12	—	—	—	**N 70 B** **N 100 B**	182–0	**0527**	0546	KT. –1 hour G.M.T.
448	18	0	14·35	34·85	26·01	—	—	—	**N 70 B** **N 100 B**	161–0	**2111**	**2131**	KT
449	19	0	9·45	34·39	26·58	8·19	50	6·03	**N 70 B**	150–0	**2140**	**2200**	KT
		10	9·51	34·40	26·58	8·20	50	—	**N 100 B**				
		20	8·96	34·38	26·66	8·17	50	6·45	**N 50 V**	100–0	**2217**		
		30	8·85	34·39	26·68	8·17	50	—	**N 70 V**	50–0			
		40	8·83	34·36	26·66	8·17	51	6·43	,,	100–50			
		50	8·86	34·36	26·66	8·17	51	—	,,	250–100			
		60	8·90	34·39	26·67	8·18	51	—	,,	500–250			
		80	9·04	34·42	26·67	8·18	51	—	,,	750–500			
		100	9·01	34·43	26·69	8·18	51	6·04	,,	1000–750	—	**0055**	
		150	8·46	34·36	26·72	8·16	51						
		200	8·37	34·36	26·73	8·16	51	5·23					
		300	7·73	34·38	26·84	8·10	65						
		400	6·14	34·36	27·04	8·08	75	4·91					
		600	4·04	34·24	27·20	8·08	92	5·04					
		800	3·31	34·33	27·34	8·08	139	4·95					
		1000	3·03	34·40	27·42	7·97	142						
		1500	2·72	34·66	27·66	8·00	142	3·84					
		2000	2·62	34·81	27·79	8·21	111						
		2500	2·42	34·81	27·80	8·26	103	4·24					
		3000	2·19	34·86	27·86	8·16	106						
		3500	1·63	34·82	27·88	8·26	113	3·96					
		4000	1·23	34·78	27·87	8·28	112	3·99					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
450	44° 57¾′ S, 12° 57¼′ E to 44° 56½′ S, 12° 54′ E	1930 12–13 x	2255	4336 br. Cl. Di.	WSW	15	WSW	3	b.	1016·9	7·5	6·0	mod. SW swell
			0325	—	W	22	W S	3	b. c.	1016·5	7·5	6·0	,,
451	47° 19¾′ S, 11° 05′ E	13–14 x	2055	3420 h.	W × N	15–20	W N	3	b.	1013·4	4·8	3·6	mod. W swell
			0015	—	W × S	15	W × N	3	c.	1014·7	4·0	3·5	,,
452	49° 50′ S, 08° 32½′ E	14 x	1930	4568 St.br.di.Oz.	N	14	N	2	o.	1009·0	4·1	3·0	heavy W N swell
			2344	—	NE	15	NE	2	o. e.	1007·0	2·0	2·0	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	TIME To	Remarks
450	20	0	11·33	34·96	26·70	8·18	59	5·91	**N 70 B**	150–0	**2246**	**2306**	KT
		10	11·33	34·96	26·70	8·18	54	—	**N 100 B**				
		20	11·33	34·96	26·70	8·18	54	5·86	**N 50 V**	100–0	**2316**		
		30	11·33	34·96	26·70	8·19	53	—	**N 70 V**	50–0			
		40	11·33	34·96	26·70	8·18	53	5·73	,,	100–50			
		50	11·33	34·96	26·70	8·18	53	—	,,	250–100			
		60	11·34	34·96	26·70	8·18	53	5·94	,,	500–250			
		80	11·34	34·96	26·70	8·18	52	—	,,	750–500			
		100	11·34	34·96	26·70	8·19	51	5·91	,,	1000–740	—	**0126**	
		150	11·34	34·96	26·70	8·19	51						
		200	11·29	34·96	26·71	8·18	51	5·92					
		300	11·18	34·94	26·71	8·18	51						
		400	9·42	34·68	26·81	8·08	74	4·83					
		600	4·97	34·27	27·12	8·07	109	5·48					
		800	3·33	34·23	27·26	8·12	117	3·96					
		1000	2·83	34·31	27·37	8·06	127						
		1500	2·61	34·61	27·63	7·99	137	3·86					
		2000	2·55	34·70	27·71	8·11	127						
		2500	2·31	34·79	27·80	8·18	117	4·40					
		3000	1·97	34·76	27·80	8·19	115						
		3500	1·39	34·76	27·85	8·10	115	4·32					
		4000	0·96	34·73	27·85	8·21	120	4·15					
451	21	0	5·15	33·86	26·78	8·13	91	7·03	**N 70 B**	170–0	**2042**	**2102**	KT
		10	5·15	33·87	26·78	8·13	90	—	**N 100 B**				
		20	5·15	33·88	26·79	8·13	90	6·96	**N 50 V**	100–0	**2113**		
		30	5·16	33·88	26·79	8·12	89	—	**N 70 V**	50–0			
		40	5·17	33·89	26·80	8·13	89	6·94	,,	100–50			
		50	5·26	33·92	26·81	8·11	89	—	,,	250–100			
		60	5·45	33·92	26·79	8·11	87	6·83	,,	500–250			
		80	5·62	33·96	26·80	8·12	82	—	,,	750–500			
		100	5·65	34·01	26·83	8·13	89	6·72	,,	1000–750	—	**2314**	
		150	5·05	34·01	26·90	8·09	92						
		200	4·77	34·19	27·08	8·04	100	5·99					
		300	3·77	34·19	27·19	7·99	107						
		400	3·40	34·20	27·23	7·97	119	4·40					
		600	2·53	34·32	27·40	7·96	122	4·93					
		800	2·51	34·40	27·47	7·93	128	4·28					
		1000	2·46	34·47	27·53	7·99	137						
		1500	2·44	34·70	27·72	8·03	129	3·88					
		2000	2·26	34·76	27·78	8·02	119						
		2500	1·75	34·72	27·79	8·05	118	4·14					
		3000	1·20	—	—	8·04	122	4·52					
452	22	0	1·94	33·79	27·03	8·09	79	7·45	**N 50 V**	100–0	**1938**		
		10	1·89	33·78	27·03	8·07	82	—	**N 70 V**	50–0			
		20	1·88	33·79	27·03	8·08	82	7·64	,,	100–50			
		30	1·88	33·78	27·03	8·08	82	—	,,	250–100			
		40	1·88	33·78	27·03	8·07	93	—	,,	500–250			
		50	1·81	33·78	27·03	8·07	95	—	,,	750–500			
		60	1·81	33·78	27·03	8·07	95	—	,,	1000–750	—	**2227**	
		80	1·80	33·78	27·03	8·06	95	—	**N 70 B**	91–0	**2325**	**2345**	KT
		100	1·71	33·78	27·04	8·06	93	7·69	**N 100 B**				
		150	1·71	33·83	27·08	8·05	93						
		200	2·01	34·13	27·30	7·98	96	5·98					
		300	2·11	34·31	27·43	7·93	102						
		400	2·20	34·40	27·50	7·90	99	4·46					
		600	2·31	34·50	27·57	8·03	101	3·97					
		800	2·29	34·61	27·66	7·93	111						
		1000	2·29	34·66	27·70	7·99	112						
		1500	2·09	34·68	27·73	8·01	106	4·17					
		2000	1·57	34·75	27·83	8·03	106						

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. °C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
452 *cont.*	49° 50′ S, 08° 32½′ E	1930 14 x											
453	54° 05½′ S, 03° 57¼′ E to 54° 07′ S, 04° 03′ E	16–17 x	2020	1807	WNW	16	WNW	3	b. c.	999·4	− 1·0	− 1·2	heavy WNW swell
			0015	—	SW × W	24	SW × W	3	o.	1003·0	− 1·7	− 2·9	mod. W swell
454	53° 42′ S, 04° 42′ E	17 x	2135	1800*	WNW	5	W	1	b. c.	1008·7	− 2·5	− 3·7	mod. SW swell
455	53° 55½′ S, 04° 47′ E	18 x	0320	1306*	—	1–2	—	1	b.	1006·1	− 2·0	− 2·0	mod. W swell
456	1 mile E of Bouvet I	18 x	1301	40*	NE	6	—	1	c.	1001·5	0·5	—	slight W swell
457	7 cables S of Bouvet I	19 x	1008	40*	SW × W	10	SW × W	2	o.	1008·3	− 1·4	− 1·8	slight SW swell
458	7 miles S 50° W of C Circumcision, Bouvet I	19 x	1300 1400	357* 377*	WSW	9	WSW	3	o.	1008·8	− 1·5	− 1·8	mod. conf. swell
459	55° 09¼′ S, 02° 00′ E	19 x	2100	3242*	WNW	17	WNW	3	o.	1009·2	− 2·2	− 2·6	mod. conf. W swell
460	56° 46′ S, 00° 41¾′ W	20–21 x	2040	—	—	0–1	—	1	c. f. e.	1013·6	− 4·0	− 4·0	slight W swell
			2145	3800									
			0100	—	NW × N	3	NW × N	1	o. s. p.	1012·4	− 4·0	− 4·0	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
452 *cont.*	22	2500	1·10	34·76	27·87	8·07	103	4·21					
		3000	0·76	34·75	27·88	8·07	103						
		3500	0·60	34·73	27·87	8·03	97	4·44					
		4000	0·54	34·72	27·87	8·04	102	5·39					
453	24	0	−1·60	34·07	27·44	7·98	95	7·28	**N 50 V**	100–0	**2040**		
		10	−1·60	34·09	27·45	7·97	95	—	**N 70 V**	50–0			
		20	−1·60	34·09	27·45	7·97	97	6·85	,,	100–50			
		30	−1·58	34·09	27·45	7·96	98	—	,,	250–100			
		40	−1·55	34·11	27·47	7·96	98	7·73	,,	500–250			
		50	−1·55	34·11	27·47	7·96	97	—	,,	750–470			
		60	−1·57	34·11	27·47	7·96	97	7·09	,,	1000–770	—	**2341**	
		80	−1·60	34·11	27·47	7·96	106	—	**N 70 B**	165–0	**2353**	**0014**	KT
		100	−1·64	34·18	27·53	7·96	106	7·49	**N 100 B**				
		150	1·30	34·25	27·58	7·92	110						
		200	0·48	34·51	27·70	7·87	110	4·90					
		300	1·19	34·63	27·76	7·84	117						
		400	1·30	34·68	27·79	7·90	108	4·43					
		600	1·48	34·76	27·84	7·99	108	4·02					
		800	1·26	34·75	27·85	8·01	108	4·39					
		1000	1·00	34·75	27·87	8·01	115						
		1500	0·52	34·73	27·88	7·98	117	4·43					
454	25	0	−1·38	34·04	27·40	—	—	—	**N 70 B**	192–0	**2147**	**2203**	KT
									N 100 B				
455	26	0	−1·59	34·06	27·43	—	—	—	**N 70 B**	116–0	**0327**	**0347**	KT. G.M.T.
									N 100 B				
456	26	0	−1·30	34·07	27·43	—	—	—	**DLH**	40–45	1307	1312	
		33	−1·10	34·13	27·47								
457	27	—	—	—	—	—	—	—	**BNR**	40–41	1011	1021	
458	27	0	−1·16	34·13	27·47	—	—	—	**DLH**	357–377	1353	1403	
		300	0·90	34·56	27·72								
459	27	0	−1·38	34·05	27·41	—	—	—	**N 70 B**	183–0	**2110**	**2130**	KT
									N 100 B				
460	28	0	−1·29	34·08	27·44	7·95	104	7·36	**N 100 B**	155–0	**2049**	**2109**	KT
		10	−1·51	34·07	27·43	7·95	104	—	**N 70 B**	174–0	**2122**	**2142**	KT
		20	−1·60	34·07	27·44	7·96	104	7·44	**N 50 V**	100–0	**2146**		
		30	−1·60	34·06	27·43	7·96	104	—	**N 70 V**	50–0			
		40	−1·60	34·07	27·44	7·96	104	7·37	,,	100–50			
		50	−1·60	34·08	27·44	7·96	104	—	,,	250–100			
		60	−1·60	34·08	27·44	7·96	104	7·35	,,	500–250			
		80	−1·59	34·09	27·45	7·95	104	—	,,	750–500			
		100	−1·40	34·09	27·45	7·94	104	6·39	,,	1000–750	—	**0026**	
		150	0·50	—	—	7·90	117						
		200	1·39	34·58	27·70	7·88	117	4·32					
		300	1·50	34·67	27·77	7·87	119						
		400	1·61	34·69	27·77	7·90	119	3·78					
		600	1·55	34·69	27·78	7·96	119	4·19					
		800	1·23	34·69	27·80	8·01	121	4·32					
		1000	0·95	34·68	27·81	7·96	127						
		1500	0·51	34·68	27·84	8·05	126	4·23					
		2000	0·31	34·68	27·85	8·05	123						
		2500	0·08	34·68	27·86	8·07	121	4·83					
		3000	−0·10	34·68	27·87	8·01	123						
		3500	−0·23	34·67	27·87	8·16	120	4·81					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
461 A	56° 44′ S, 02° 23¾′ W	1930 21 x	1405	—	NNW	15	NNW	3	o.	1005·0	−2·5	−2·6	mod. N swell
461 B	56° 44′ S, 02° 23′ W	21 x	1805	—	NNW	14	NNW	3	o. s.	1004·2	−2·2	−2·3	mod. N swell
461 C	56° 44′ S, 02° 22′ W	21–22 x	2205	—	SSW	15	conf.	3	o. p. s.	1005·0	−2·7	−2·8	mod. conf. NW swell
461 D	56° 41′ S, 02° 24′ W	22 x	0210	—	SW	17	SW	2	o.	1005·8	−4·0	−4·0	slight W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	TIME To	Remarks
461 A	o	0	–1·72	34·15	27·51	—	104	—	**N 100 B**	80–0	1434	1454	DGP, KT
		10	–1·72	34·15	27·51	—	104	—	,,	170–80	,,	1455	
		20	–1·72	34·15	27·51	—	104	—	,,	270–170	,,	1455½	
		30	–1·72	34·15	27·51	—	104	—	,,	385–270	,,	1456	
		40	–1·72	34·15	27·51	—	109	—	,,	510–385	,,	1456½	
		50	–1·73	34·15	27·51	—	110	—	,,	650–510	,,	1457	
		60	–1·74	34·15	27·51	—	109	—	**N 50 V**	100–0	1603		
		80	1·77	34·15	27·51	—	109	—	**N 70 V**	50–0			
		100	–1·71	34·15	27·51	—	109	—	,,	100–50			
		125	–1·30	34·40	27·69	—	109	—	,,	250–100			
		150	–1·08	34·42	27·70	—	109	—	,,	500–250			
		175	–0·89	34·46	27·73	—	109	—	,,	750–500	—	1741	
		200	0·38	34·60	27·78	—	109						
		300	0·84	34·66	27·80	—	109						
		400	0·80	34·69	27·83	—	109						
461 B	o	0	–1·83	34·11	27·48	—	—	—	**N 100 B**	75–0	1830	1848	DGP, KT
		10	–1·83	34·12	27·48	—	—	—	,,	160–75	,,	1849	
		20	–1·83	34·12	27·48	—	—	—	,,	255–160	,,	1849½	
		30	–1·82	34·14	27·50	—	—	—	,,	345–255	,,	1850	
		40	–1·81	34·15	27·51	—	—	—	,,	440–345	,,	1850½	
		50	–1·80	34·16	27·52	—	—	—	,,	520–440	,,	1851	
		60	–1·80	34·17	27·52	—	—	—	**N 50 V**	100–0	1956		
		80	–1·80	34·18	27·53	—	—	—	**N 70 V**	50–0			
		100	–1·70	34·22	27·56	—	—	—	,,	100–50			
		150	1·38	34·40	27·70	—	—	—	,,	250–100			
		200	–0·80	34·48	27·74	—	—	—	,,	500–250			
		250	0·42	34·61	27·79	—	—	—	,,	750–500	—	**2127**	
		300	0·82	34·66	27·81								
		400	0·75	34·67	27·82								
461 C	o	0	–1·80	34·16	27·52	—	—	—	**N 100 B**	95–0	**2236**	**2256**	DGP, KT
		10	–1·80	34·17	27·52	—	—	—	,,	200–95	,,	**2257**	
		20	–1·80	34·17	27·52	—	—	—	,,	310–200	,,	**2257½**	
		30	–1·80	34·17	27·52	—	—	—	,,	420–310	,,	**2258**	
		40	–1·80	34·18	27·53	—	—	—	,,	535–420	,,	**2258½**	
		50	–1·80	34·19	27·54	—	—	—	,,	660–535	,,	**2259**	
		60	–1·80	34·20	27·55	—	—	—	**N 50 V**	100–0	**2344**		
		80	–1·80	34·20	27·55	—	—	—	**N 70 V**	50–0			
		100	–1·68	34·22	27·56	—	—	—	,,	100–50			
		150	–1·18	34·43	27·71	—	—	—	,,	250–100			
		200	–0·50	34·51	27·75	—	—	—	,,	500–250	—	**0130**	
		250	0·40	34·60	27·78								
		300	0·79	34·66	27·81								
		400	0·80	34·69	27·83								
461 D	o	0	–1·72	34·15	27·51	—	—	—	**N 100 B**	85–0	**0237**	**0257**	DGP, KT
		10	1·72	34·16	27·52	—	—	—	,,	180–85	,,	**0258**	
		20	–1·72	34·16	27·52	—	—	—	,,	280–180	,,	**0258½**	
		30	–1·72	34·16	27·52	—	—	—	,,	385–280	,,	**0259**	
		40	–1·74	34·16	27·52	—	—	—	,,	490–385	,,	**0259½**	
		50	–1·75	34·16	27·52	—	—	—	,,	600–490	,,	**0300**	
		60	–1·75	34·16	27·52	—	—	—	**N 50 V**	100–0	0355		
		80	–1·73	34·16	27·52	—	—	—	**N 70 V**	50–0			
		100	–1·60	34·30	27·62	—	—	—	,,	100–50			
		150	–1·22	34·43	27·72	—	—	—	,,	250–100			
		200	–0·82	34·47	27·74	—	—	—	,,	500–250			
		230	–0·02	34·54	27·76	—	—	—	,,	750–500	—	0516	
		300	0·79	34·65	27·80								
		400	0·82	34·67	27·81								

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
461 E	56° 41′ S, 02° 24′ W	1930 22 x	0605	—	S × E	15	S × E	2	o.	1005·6	– 4·5	– 4·8	slight conf. swell
461 F	56° 44′ S, 02° 22′ W	22 x	1005	—	SE	14	SE	3	o.	1003·0	0·5	– 1·8	slight conf. swell
461 G	56° 44¾′ S, 02° 21½′ W to 56° 44½′ S, 02° 21′ W	22 x	1401	—	NE × E	12	NE × E	3	o. p. s.	999·2	– 1·5	– 1·5	slight NE swell
			1535	3751*	NE × E	18	NE × E	3	o.	998·4	– 2·0	– 2·0	,,
			1825	—	ENE	21	ENE	3	o.	995·6	– 2·3	– 2·5	no swell
462	56° 01′ S, 07° 28′ W	23 x	2130	3712*	SSW	20	SSW	4	o. p. s.	973·5	– 2·5	– 2·2	mod. NNE swell
463	55° 42′ S, 10° 54′ W	24 x	2105	4186*	SW × W	15	—	1	o.	1005·9	– 7·0	– 7·5	In lee of pack-ice
			0000	—	WNW	16	WNW	1	o.	1002·8	– 6·6	– 6·9	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
461 E	0	0	− 1·80	34·17	27·52	—	—	—	**N 100 B**	75–0	0629	0649	DGP, KT
		10	− 1·80	34·17	27·52	—	—	—	,,	160–75	,,	0650	
		20	− 1·80	34·17	27·52	—	—	—	,,	245–160	,,	0650½	
		30	− 1·80	34·17	27·52	—	—	—	,,	330–245	,,	0651	
		40	− 1·80	34·17	27·52	—	—	—	,,	420–330	,,	0651½	
		50	− 1·80	34·17	27·52	—	—	—	,,	515–420	,,	0652	
		60	− 1·80	34·18	27·53	—	—	—	**N 50 V**	100–0	0725		
		80	− 1·80	34·20	27·55	—	—	—	**N 70 V**	50–0			
		100	− 1·71	34·24	27·58	—	—	—	,,	100–50			
		150	− 1·29	34·43	27·72	—	—	—	,,	250–100			
		200	− 0·57	34·51	27·76	—	—	—	,,	500–250			
		220	− 0·20	34·56	27·78	—	—	—	,,	750–500	—	0842	
		300	0·80	34·68	27·82								
		400	0·80	34·69	27·83								
461 F	0	0	− 1·72	34·14	27·50	—	—	—	**N 100 B**	80–0	1025	1046	DGP, KT
		10	− 1·76	34·16	27·51	—	—	—	,,	175–80	,,	1047	
		20	− 1·79	34·17	27·52	—	—	—	,,	270–175	,,	1047½	
		30	− 1·80	34·17	27·52	—	—	—	,,	375–270	,,	1048	
		40	− 1·80	34·17	27·52	—	—	—	,,	490–375	,,	1048½	
		50	− 1·80	34·17	27·52	—	—	—	,,	615–490	,,	1049	
		60	− 1·80	34·18	27·53	—	—	—	**N 50 V**	100–0	1130		
		80	− 1·79	34·18	27·53	—	—	—	**N 70 V**	50–0			
		100	− 1·60	34·28	27·61	—	—	—	,,	100–50			
		150	− 1·00	34·46	27·73	—	—	—	,,	250–100			
		200	0·12	34·59	27·79	—	—	—	,,	500–250			
		300	0·79	34·68	27·82	—	—	—	,,	750–500	—	1315	
		400	0·80	34·69	27·83	—	—	—					
461 G	1	0	− 1·74	34·17	27·52	7·94	104	6·40	**N 100 B**	95–0	1429	1449	DGP, KT
		10	− 1·74	34·17	27·52	7·93	104	—	,,	205–95	,,	1450	
		20	− 1·76	34·18	27·53	7·94	107	7·22	,,	315–205 (−0)	,,	1456½	
		30	− 1·80	34·18	27·53	7·94	107	—	,,	435–315 (−95)	,,	1457	
		40	− 1·80	34·18	27·53	7·94	107	7·35	,,	560–435 (−205)	,,	1457½	
		50	− 1·80	34·18	27·53	7·94	109	—	,,	700–560 (−315)	,,	1458	
		60	− 1·80	34·18	27·53	7·94	109	7·25	**N 50 V**	100–0	1540		
		80	− 1·80	34·18	27·53	7·94	109	—	**N 70 V**	50–0			
		100	− 1·80	34·19	27·54	7·94	109	6·89	,,	100–50			
		150	− 1·72	34·19	27·54	7·92	109	—	,,	250–100			
		175	− 1·05	34·47	27·75	7·89	109	—	,,	500–250			
		200	− 0·18	34·54	27·76	7·88	109	4·76	,,	750–500			
		300	0·86	34·69	27·83	7·85	109	—	,,	1000–750	—	1736	
		400	0·80	34·70	27·84	7·89	109	4·55					
		600	0·53	34·70	27·85	7·93	109	4·56					
		800	0·43	34·69	27·85	7·92	115	4·46					
		1000	0·40	34·68	27·85	7·92	123						
		1500	0·15	34·67	27·85	7·98	127	4·62					
		2000	− 0·04	34·67	27·86	8·01	124						
		2500	− 0·21	34·67	27·87	7·99	117	5·03					
		3000	− 0·27	34·67	27·87	8·02	116						
		3500	− 0·35	34·67	27·88	8·00	113	5·12					
462	2	0	− 1·55	33·87	27·27	—	—	—	**N 70 B**, **N 100 B**	90–0	**2159**	**2219**	KT
									N 100 B	350–90	**2159**	**2222**	DGP
463	3	0	− 1·80	33·89	27·30	7·97	—	8·03	**N 70 B**, **N 100 B**	132–0	**2042**	**2102**	KT. + 1 hour G.M.T.
		10	− 1·75	33·86	27·27	7·98	—	—					

Hour 1150–1350	
Depth	ccs. of N/10 uranyl oxalate decomposed per hour
0	2·60
1	1·43
5	1·20
10	1·00
15	0·76
20	0·65
25	0·55
30	0·48
35	0·34
40	0·25

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
463 *cont.*	55° 42′ S, 10° 54′ W	1930 24 x											
464	56° 03′ S, 12° 18′ W	26 x	1030	—	W	28	W	3	o. q.	985·0	− 1·5	− 1·7	In open lead in close pack-ice
465	55° 49′ S, 14° 02¼′ W	26 x	2055	—	W	22	W	2–3	o. p. s.	981·1	− 2·3	− 2·8	slight WNW swell. In lee of pack-ice
466	55° 35′ S, 16° 31½′ W	27 x	2046	4928*	SSW	24	—	0	o. s.	989·4	− 6·8	− 7·4	In pack-ice
467	54° 39½′ S, 19° 05½′ W to 54° 40½′ S, 18° 58′ W	28–29 x	2103	4793*	WSW	20	WSW	4	c.	1008·1	− 5·2	− 6·0	slight conf. W swell
			0205	—	SW [illegible] W	15	SW [illegible] W	3	o.	1009·1	− 4·8	− 5·0	slight W swell
468	54° 48′ S, 20° 41½′ W	29 x	1130	—	NW [illegible] W	12	—	1	c.	1011·9	0·2	− 0·2	mod. W swell
469	54° 07¼′ S, 22° 01¾′ W	29 x	2135	—	NNW	3	NNW	0–1	o.	1011·6	− 0·5	− 0·5	slight NW swell
470	54° 42½′ S, 26° 36¾′ W	30 x	2107	—	E	16	E	3	o. s.	989·3	− 1·5	− 1·6	heavy NNW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
463 *cont.*	3	20	−1·72	33·86	27·27	7·97	—	8·05	N 50 V	100–0	2114		
		30	−1·72	33·86	27·27	7·98	—	—	N 70 V	50–0			
		40	−1·72	33·86	27·27	7·98	—	8·00	,,	100–50			
		50	−1·72	33·86	27·27	7·97	—	—	,,	250–100			
		60	−1·72	33·86	27·27	7·98	—	7·98	,,	500–250			
		80	−1·72	33·86	27·27	7·98	—	—	,,	750–500			
		100	−1·72	33·86	27·27	7·97	—	7·97	,,	1000–750	—	2325	
		150	−1·42	33·89	27·29	7·92							
		200	0·32	34·13	27·41	7·88	—	5·74					
		300	1·71	34·51	27·62	7·84							
		400	1·82	34·61	27·69	7·84	—	4·09					
		600	1·87	34·65	27·72	7·90	—	3·98					
		800	1·79	34·70	27·77	7·97	—	3·72					
		1000	1·66	34·70	27·78	7·96							
		1500	1·15	34·69	27·81	8·01	—	3·62					
		2000	0·63	34·69	27·84	8·02							
		2500	0·37	34·67	27·84	8·04	—	3·70					
		3000	0·14	34·67	27·85	8·05							
		3500	−0·06	34·66	27·85	8·05	—	4·84					
464	5	0	−1·75	33·79	27·21	—	—	—	N 70 H N 100 H	67 (−0)	1028	1048	KT
465	5	0	−1·68	33·84	27·25	—	—	—	N 70 B N 100 B	113–0	2059	2117	KT
466	6	0	−1·60	33·78	27·20	—	—	—	N 70 B N 100 B	79–0	2053	2113	KT
467	7	0	−1·07	33·84	27·24	7·98	112	7·97	N 70 B N 100 B	143–0	2039	2059	KT
		10	−1·07	33·84	27·24	7·98	113	—					
		20	−1·07	33·84	27·24	7·98	112	7·94	N 50 V	100–0	2108		
		30	−1·07	33·84	27·24	7·97	112	—	N 70 V	50–0			
		40	−1·05	33·84	27·24	7·97	112	7·97	,,	100–50			
		50	−1·07	33·85	27·24	7·96	112	—	,,	250–100			
		60	−1·13	33·84	27·24	7·95	112	7·92	,,	500–250			
		80	−1·01	33·85	27·24	7·96	112	—	,,	770–470			
		100	−1·00	33·87	27·26	7·96	112	6·49	,,	1000–750	—	2337	
		150	−0·62	33·95	27·31	7·95	119						
		200	−0·13	34·09	27·40	7·92	123	7·23					
		300	1·30	34·36	27·53	7·82	138						
		400	1·80	34·60	27·69	7·82	138	4·19					
		600	1·96	34·64	27·71	7·85	138						
		800	1·88	34·67	27·74	7·87	133	3·89					
		1000	1·76	34·70	27·77	7·93	133						
		1500	1·34	34·72	27·82	7·94	133	4·26					
		2000	0·84	34·72	27·85	7·94	133						
		2500	0·64	34·69	27·84	7·98	140	4·46					
		3000	0·34	34·67	27·84	7·98	138						
		3500	0·15	34·67	27·85	7·98	138	4·60					
		4000	−0·05	34·67	27·86	8·05	138						
		4500	−0·20	34·65	27·85	8·04	138						
468	8	0	−1·20	33·79	27·20	—	—	—	TYFV	100–0	1230	1236	
									,,	200–0	1210	1221	
									,,	300–0	1133	1153	
469	8	0	−1·05	33·87	27·26	—	—	—	N 70 B N 100 B	151–0	2141	2201	KT
470	9	0	−1·08	33·69	27·11	—	—	—	N 70 B N 100 B	91–0	2118	2138	KT. + 2 hours G.M.T.

Remarks, Station 463:

Depth	Nitrite N_2 mgm./m.³	Nitrate + Nitrite N_2 mgm./m.³
0	9·1	840
10	9·5	640
20	8·9	440
40	8·9	440
60	8·9	640
80	8·3	640
100	8·3	840
150	6·2	840
200	0·0	840
400	0·0	840
600	0·0	740
1000	0·0	740
2000	0·0	540
3500	0·0	540

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
471	South Sandwich Deep, 54° 57′ S, 27° 59½′ W	1930 31 x–1 xi	1200	7882	SE	15	SE	2	o.	981·6	−2·1	−2·3	heavy NE swell
			1600	—	S × E	15	S × E	3	o.	979·7	−2·6	−3·2	,,
			2350	—	S × E	20	S × E	2	o. p. s.	976·9	−2·8	−3·0	mod. NE swell
472	53° 23′ S, 30° 29½′ W	1 xi	2020	—	SSW	16	SSW	2–3	o. l. s.	977·7	−1·7	−2·0	mod. conf. swell
473	3 miles S 60° E of Jason I, South Georgia	3 xi	1530	—	SE	19	SE	3	c. q.	990·9	−1·9	−2·1	mod. SE swell
474	1 mile W of Shag Rocks, South Georgia	12 xi	1325	199*	S	21	S	3	o.	997·0	−1·1	−1·4	mod. to heavy S swell
475	53° 30¼′ S, 42° 44½′ W	12 xi	1645	748*	S × W	20	S × W	3	o.	999·2	−0·5	−0·5	mod. S × W swell
476	1 mile N of Shag Rocks, South Georgia	12 xi	2129	165	S × W	14	S × W	3	o. p. s.	1000·2	−1·7	−2·2	mod. S swell
477	53° 35½′ S, 41° 25¾′ W	13 xi	0015	144*	S × W	17	S × W	3	c. p. s.	1000·5	−1·5	−1·9	mod. SSE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
471	10	0	−1·62	34·04	27·41	7·96	121	7·82	**N 50 V**	100–0	1750		
		10	−1·62	34·03	27·41	7·96	123	—	**N 70 V**	50–0			
		20	−1·62	34·04	27·41	7·96	122	7·78	,,	100–50			
		30	−1·62	34·04	27·41	7·96	121	—	,,	250–100			
		40	−1·62	34·04	27·41	7·96	122	7·73	,,	500–250			
		50	−1·66	34·04	27·41	7·95	123	—	,,	750–550			
		60	−1·69	34·04	27·41	7·95	123	7·68	,,	1000–750	—	1937	
		80	−1·77	34·04	27·42	7·95	123	—	**N 70 B**	168–0	**2356**	**0016**	KT
		100	−1·77	34·07	27·44	7·95	123	7·59	**N 100 B**				
		150	−0·78	34·25	27·56	7·90	131						
		200	0·13	34·47	27·69	7·87	135	5·28					
		300	0·87	34·63	27·78	7·86	135						
		400	1·02	34·67	27·80	7·87	135	4·59					
		600	0·99	34·69	27·82	7·88	135	4·54					
		800	0·79	34·69	27·83	7·88	137	4·44					
		1000	0·65	34·69	27·84	8·00	136						
		1500	0·38	34·67	27·84	7·99	142	4·45					
		2000	0·19	34·67	27·85	7·98	141						
		2500	−0·04	34·66	27·85	8·00	140	4·91					
		3000	−0·19	34·66	27·86	8·03	137						
		3500	−0·29	34·66	27·87	8·11	136	4·94					
		4000	−0·37	34·66	27·87	8·11	139						
		4500	−0·38	34·66	27·87	8·07	142	5·11					
		5000	−0·36	34·66	27·87	8·05	139						
		5500	−0·29	34·66	27·87	8·24	129	4·94					
		6000	−0·27	34·66	27·87	8·23	135						
		6350	−0·22	34·66	27·86	8·22	126						
		6500	−0·19	34·66	27·86	8·19	126						
		7250	−0·10	34·66	27·86	8·22	125	4·38					
472	11	0	−1·22	33·98	27·35	—	—	—	**N 70 B**	111–0	**2030**	**2050**	KT
									N 100 B				
473	13	0	−0·45	33·84	27·21	—	—	—	**N 50 V**	100–0	1534	1548	Two hauls. +3 hours G.M.T.
474	22	0	−0·01	34·02	27·34	—	—	—	**DLH**	199	1333	1339	+2 hours G.M.T.
		120	−0·18	34·05	27·37								
475	22	0	0·00	34·03	27·34	7·98	109	7·54	**N 50 V**	100–0	1653		
		10	0·00	34·03	27·34	7·98	110	—	**N 70 V**	50–0			
		20	0·00	34·03	27·34	7·99	110	7·68	,,	100–50			
		30	−0·01	34·03	27·34	7·99	110	—	,,	250–100			
		40	−0·01	34·03	27·34	8·00	103	7·23	,,	500–250			
		50	−0·01	34·03	27·34	8·00	104	—	,,	700–500	—	1825	
		60	−0·03	34·03	27·35	8·01	104	7·70	**N 70 B**	165–0	1835	1855	KT
		80	−0·10	34·03	27·35	8·01	105	—	**N 100 B**				
		100	0·09	34·07	27·37	8·00	109	7·03					
		150	0·41	34·16	27·43	7·96	130						
		200	1·00	34·28	27·49	7·93	135	5·68					
		300	1·42	34·39	27·55	7·89	139						
		400	1·79	34·46	27·58	7·89	148	5·60					
		600	2·03	34·57	27·64	7·89	159	4·03					
		700	2·02	34·61	27·68	7·89	144						
476	22	0	0·05	34·04	27·35	—	—	—	**N 70 B**	165–0	2138	**2200**	KT. N 100 touched bottom
									N 100 B				
477	22	0	0·00	34·02	27·34	7·98	104	—	**N 50 V**	100–0	**0029**	—	N 50 not fishing properly
		10	−0·02	34·02	27·34	7·98	104	—	**N 70 V**	50–0			
		20	−0·05	34·02	27·34	7·99	109	—	,,	100–50	—	**0055**	
		30	−0·05	34·02	27·34	7·99	101	—	**N 70 B**	132–0	**0134**	**0153**	KT

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
477 *cont.*	53° 35½′ S, 41° 25¾′ W	1930 13 xi											
478	53° 38½′ S, 40° 53′ W	13 xi	0416	2136*	SSW	15	SSW	3	o.	1000·8	−2·0	−2·2	mod. SSW swell
			0700	—	SSW	12	SSW	2	c.	1001·4	−0·8	−1·0	slight S swell
479	53° 38¾′ S, 40° 21¾′ W	13 xi	0851	2423*	SW	10	SW	2	o.	1001·3	−0·8	−1·5	mod. conf. SW swell
			1054	—	SW	7	SW	2	o.	1000·8	0·75	0·5	mod. SWswell
480	53° 40½′ S, 39° 54′ W	13 xi	1600	2254*	SW	3	SW	1	o.	1000·1	−0·6	−0·8	mod. conf. swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	TIME To	Remarks
477 *cont.*	22	40	−0·05	34·02	27·34	8·00	102	—	**N 100 B**	132–0	**0134**	**0153**	KT
		50	−0·05	34·02	27·34	8·01	101						
		60	−0·05	34·02	27·34	8·01	101						
		80	−0·10	34·04	27·36	8·00	101						
		100	0·11	34·11	27·40	7·97	103						
		125	0·30	34·14	27·42	7·96	108						
478	22	0	0·20	33·93	27·25	8·01	101	7·56	**N 50 V**	100–0	0433		
		10	0·20	33·93	27·25	8·01	101	—	**N 70 V**	50–0			
		20	0·20	33·93	27·25	8·01	101	7·58	,,	100–50			
		30	0·20	33·93	27·25	8·01	101	—	,,	250–100			
		40	0·20	33·93	27·25	8·01	101	7·56	,,	500–250			
		50	0·20	33·94	27·26	8·01	102	—	,,	750–500			
		60	0·23	33·97	27·28	8·00	101	7·31	,,	1000–750	—	0630	
		80	0·40	34·02	27·31	7·97	103	—	**N 70 B**	200–0	0638	0658	KT
		100	0·40	34·04	27·33	7·97	106	6·86	**N 100 B**				
		150	0·40	34·05	27·34	7·96	106						
		200	0·60	34·14	27·40	7·96	107	5·25					
		300	1·52	34·32	27·48	7·89	116						
		400	1·80	34·42	27·54	7·91	108	4·78					
		600	2·12	34·58	27·64	7·97	116	3·80					
		800	2·09	34·65	27·71	7·96	116	3·74					
		1000	2·00	34·69	27·75	7·99	116						
		1500	1·61	34·72	27·80	8·01	109	4·00					
		2000	1·40	34·71	27·81	8·01	113	4·07					
479	22	0	−0·62	33·91	27·28	7·99	86	—	**N 50 V**	100–0	0858		
		10	−0·66	33·91	27·28	8·00	90	—	**N 70 V**	50–0			
		20	−0·68	33·91	27·28	8·00	93	—	,,	100–50			
		30	−0·68	33·91	27·28	7·99	94	—	,,	250–100			
		40	−0·69	33·91	27·28	8·00	96	—	,,	500–250			
		50	−0·70	33·91	27·28	8·00	101	—	,,	750–500			
		60	−0·70	33·91	27·28	8·00	102	—	,,	1000–750	—	1050	
		80	−0·72	33·96	27·32	7·98	102	—	**N 70 B**	100–0	1116	1136	KT
		100	−0·81	33·96	27·32	7·93	102	—	**N 100 B**				
		150	−0·50	34·12	27·44	7·90	113	—	**N 100 B**	320–100	1116	1150	DGP
		200	0·52	34·18	27·44	7·88	114						
		300	1·55	34·38	27·53	7·85	119						
		400	1·78	34·39	27·52	7·89	120						
		600	2·11	34·60	27·66	7·90	129						
		800	2·06	34·65	27·71	7·90	129						
		1000	1·95	34·67	27·73	7·90	142						
		1500	1·54	34·72	27·80	7·94	122						
		2000	1·16	34·71	27·82	7·96	112						
480	23	0	−0·58	33·88	27·25	8·03	106	7·95	**N 50 V**	100–0	1608		
		10	−0·68	33·89	27·26	8·02	100	—	**N 70 V**	50–0			
		20	−0·69	33·89	27·26	8·03	99	8·06	,,	100–50			
		30	−0·71	33·90	27·27	8·03	99	—	,,	250–100			
		40	−0·77	33·90	27·27	8·03	99	8·08	,,	500–250			
		50	−0·77	33·91	27·28	8·02	99	—	,,	750–500			
		60	−0·79	33·95	27·31	8·02	99	8·00	,,	1000–750	—	1805	
		80	−0·80	33·96	27·32	8·02	100	—	**N 70 B**	161–0	1827	1849	KT
		100	−1·19	33·99	27·36	7·99	106	7·64	**N 100 B**				
		125	−0·46	34·06	27·39	7·97	—	—	**N 100 B**	440–161	1827	1859	DGP
		150	0·69	34·13	27·39	7·96	122						
		200	0·72	34·26	27·49	7·92	129	5·53					
		300	1·71	34·44	27·57	7·87	127						
		400	1·99	34·58	27·66	7·86	119	4·07					
		600	1·99	34·62	27·69	7·96	124	3·89					
		800	1·88	34·68	27·75	7·97	124	3·86					
		1000	1·79	34·72	27·78	7·97	119						

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
480 *cont.*	53° 40½′ S, 39° 54′ W	1930 13 xi											
481	53° 44¼′ S, 39° 29½′ W	13–14 xi	2043	2507*	SSW	4	SSW	1	o.	1000·8	−0·8	−1·4	slight conf. swell
			2342	—	SSW	2	SSW	0–1	o.	1001·4	−0·1	−0·3	slight conf. S swell
482	53° 46¾′ S, 39° 04¾′ W	14 xi	0500	1664*	S × W	20	S × W	3	o. m.	1002·8	−0·8	−0·8	mod. SSW swell
			0903	—	S × W	26	S × W	4	o.	1005·7	−0·8	−1·3	mod. S swell
483	53° 54¼′ S, 38° 25½′ W	14 xi	1308	177*	S × W	25–27	S × W	5	o. q.	1007·7	−0·8	−1·0	heavy conf. S × W swell
484	53° 52¼′ S, 37° 05½′ W	16 xi	0730	185*	WSW	30	WSW	3	b.	1005·8	3·0	2·0	mod. WSW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
480 *cont.*	23	1500	1·33	34·72	27·82	8·00	110	4·11					
		2000	1·09	34·71	27·83	8·01	114	4·25					
481	23	0	– 0·50	33·92	27·28	8·03	90	—	**N 50 V**	100–0	2055		
		10	– 0·55	33·96	27·31	8·03	90	—	**N 70 V**	50–0			
		20	– 0·60	33·96	27·31	8·02	90	—	,,	100–50			
		30	– 0·61	34·00	27·35	8·03	90	—	,,	250–100			
		40	– 0·61	34·00	27·35	8·03	90	—	,,	500–250			
		50	– 0·62	34·00	27·35	8·03	91	—	,,	750–500			
		60	– 0·64	34·00	27·35	8·02	91	—	,,	1000–750	—	**2234**	
		80	– 0·68	34·00	27·35	8·02	91	—	**N 70 B**	139–0			
		100	– 0·80	34·00	27·35	7·98	94	—	**N 100 B**		**0000**	**0020**	KT
		150	– 0·09	34·16	27·45	7·95	116	—	**N 100 B**	375–140	**0000**	**0030**	DGP
		200	0·70	34·25	27·48	7·89	116						
		300	1·81	34·47	27·58	7·85	110						
		400	1·92	34·55	27·64	7·84	123						
		600	1·99	34·65	27·71	7·96	128						
		800	1·89	34·66	27·73	7·95	128						
		1000	1·73	34·71	27·78	7·98	121						
		1500	1·38	34·72	27·82	7·97	119						
		2000	1·03	34·72	27·84	7·98	119						
482	23	0	– 0·58	33·96	27·31	8·02	93	8·03	**N 70 B**	168–0	0519	0538	KT
		10	– 0·58	33·96	27·31	8·02	95	—	**N 100 B**				
		20	– 0·58	33·96	27·31	8·02	96	8·01	**N 50 V**	100–0	0600		
		30	– 0·60	33·96	27·31	8·02	96	—	**N 70 V**	50–0			
		40	– 0·60	33·96	27·31	8·02	94	8·06	,,	100–50			
		50	– 0·60	33·96	27·31	8·02	92	—	,,	250–100			
		60	– 0·66	33·96	27·32	8·02	93	8·05	,,	500–250			
		80	– 0·67	33·96	27·32	8·01	93	—	,,	750–500			
		100	– 0·70	33·96	27·32	8·01	96	7·96	,,	1000–750	—	0908	
		150	– 0·38	34·06	27·38	7·95	107						
		200	0·05	34·14	27·43	7·92	110	6·27					
		300	1·40	34·34	27·51	7·86	118						
		400	1·90	34·51	27·61	7·84	118	4·13					
		600	2·01	34·61	27·68	7·95	122	3·75					
		800	1·93	34·64	27·71	7·96	124	3·78					
		1000	1·82	34·69	27·76	7·97	119						
		1500	1·42	34·70	27·80	8·01	115	4·02					
483	24	0	– 0·50	34·03	27·37	7·98	98	—	**N 50 V**	100–0	1315		
		5	– 0·47	—	—	—	—	—	**N 70 V**	50–0			
		10	– 0·47	34·03	27·37	7·99	97	—	,,	100–50			
		15	– 0·47	—	—	—	—	—	,,	150–100	—	1350	
		20	– 0·47	34·03	27·37	7·99	96	—	**N 70 B**	110–0	1418	1438	KT
		25	– 0·47	—	—	—	—	—	**N 100 B**				
		30	– 0·47	34·03	27·37	7·99	100						
		40	– 0·48	34·03	27·37	7·99	97						
		50	– 0·45	34·03	27·37	7·99	100						
		60	– 0·48	34·03	27·37	7·99	100						
		80	– 0·60	34·05	27·39	7·96	100						
		100	– 0·67	34·08	27·41	7·94	110						
		150	– 0·40	34·13	27·44	7·91	110						
484	25	0	– 0·56	33·96	27·31	8·00	81	—	**N 50 V**	100–0	0738	—	+ 1 hour G.M.T.
		10	– 0·58	33·96	27·31	8·00	80	—	**N 70 V**	50–0			
		20	– 0·58	33·96	27·31	7·99	78	—	,,	100–50			
		30	– 0·59	33·96	27·31	8·00	78	—	,,	150–100	—	0814	
		40	– 0·60	33·96	27·31	8·01	77	—	**N 70 B**	73–0	0825	0845	KT
		50	– 0·62	33·96	27·32	8·00	78	—	**N 100 B**				
		60	– 0·70	33·96	27·32	8·00	79						
		80	– 0·91	33·97	27·33	7·99	79						

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. °C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
484 *cont.*	53° 52¼′ S, 37° 05½′ W	1930 16 xi											
485	53° 37¼′ S, 37° 18′ W	16 xi	1015	205*	WSW	20	WSW	3	b.	1009·9	1·0	0·5	mod. WSW swell
486	53° 24¼′ S, 37° 29¾′ W	16 xi	1320	1891*	WSW	20	WSW	4	b. z.	1012·0	0·7	− 0·2	mod. WSW swell
487	53° 11½′ S, 37° 41¾′ W	16 xi	1828	3548*	WSW	22	WSW	4	b.	1012·8	1·0	0·4	mod. WSW swell
			2155	—	WSW	21	WSW	4	b.	1014·0	0·4	0·2	heavy WSW swell
488	52 59¾′ S, 37 48′ W	17 xi	0150	3309*	WSW	20	WSW	4	b.	1014·1	0·2	0·0	mod. to heavy WSW swell
			0430	—	W · S	20	W · S	4	f. e.	1013·4	− 1·1	− 1·2	mod. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
484 *cont.*	25	100	−1·01	34·03	27·39	7·97	83						
		150	−0·58	34·14	27·46	7·92	90						
485	26	0	−0·60	33·94	27·30	8·05	70	8·27	N 50 V	100–0	1021		
		10	−0·64	33·94	27·30	8·05	72	—	N 70 V	50–0			
		20	−0·69	33·94	27·30	8·05	69	8·14	,,	100–50			
		30	−0·71	33·94	27·30	8·05	69	—	,,	180–100	—	1055	
		40	−0·71	33·94	27·30	8·05	86	8·17	N 70 B	133–0	1124	1144	KT
		50	−0·71	33·94	27·30	8·05	78	—	N 100 B				
		60	−0·72	33·94	27·30	8·05	80	8·18					
		80	−0·83	33·97	27·33	8·04	86						
		100	−0·74	34·14	27·40	7·98	96	7·45					
		150	0·00	34·14	27·43	7·97	100						
		175	0·08	34·16	27·44	7·96	100	6·20					
486	26	0	−0·41	33·97	27·31	8·06	79	—	N 50 V	100–0	1326		
		10	−0·43	33·97	27·31	8·06	76	—	N 70 V	50–0			
		20	−0·43	33·97	27·31	8·05	75	—	,,	100–50			
		30	−0·48	33·97	27·32	8·05	76	—	,,	250–100			
		40	−0·52	33·97	27·32	8·05	79	—	,,	500–250			
		50	−0·59	33·97	27·32	8·04	94	—	,,	750–500			
		60	−0·67	33·97	27·32	8·04	86	—	,,	1000–750	—	1514	
		80	−0·79	33·97	27·33	8·03	85	—	N 70 B	124–0	1603	1623	KT
		100	−0·81	34·04	27·39	8·02	86	—	N 100 B				
		150	0·09	34·22	27·49	7·93	100	—	N 100 B	375–124	1603	1637	DGP
		200	0·80	34·31	27·52	7·89	106						
		300	1·80	34·50	27·61	7·87	110						
		400	1·95	34·58	27·66	7·86	110						
		600	1·98	34·66	27·72	7·88	115						
		800	1·91	34·68	27·75	7·89	112						
		1000	1·72	34·70	27·78	7·95	112						
		1500	1·33	34·69	27·80	7·95	112						
487	26	0	−0·39	33·92	27·27	8·05	80	7·85	N 50 V	100–0	1835		+ 2 hours G.M.T.
		10	−0·40	33·93	27·28	8·05	79	—	N 70 V	50–0			
		20	−0·44	33·94	27·29	8·05	79	7·85	,,	100–50			
		30	0·50	33·94	27·29	8·04	79	—	,,	250–100			
		40	0·54	33·94	27·29	8·04	78	7·85	,,	500–250			
		50	−0·55	33·94	27·30	8·04	79	—	,,	750–500			
		60	−0·56	33·94	27·30	8·04	81	7·89	,,	1000–750	—	2058	
		80	−0·62	33·94	27·30	8·04	81	—	N 70 B	108–0	2210	2230	KT
		100	−0·88	34·02	27·38	7·99	93	6·98	N 100 B				
		150	−0·20	34·11	27·42	7·96	93	—	N 100 B	320–108	2210	2239	DGP
		175	0·63	34·23	27·47	7·93							
		200	1·30	34·31	27·49	7·89	108	4·96					
		300	1·88	34·45	27·56	7·86	109						
		400	2·00	34·54	27·62	7·86	110	3·93					
		600	1·99	34·61	27·68	8·00	115	3·74					
		800	1·93	34·64	27·71	8·00	105	4·03					
		1000	1·79	34·69	27·76	7·95	104						
		1500	1·53	34·71	27·80	7·95	106	4·08					
		2000	1·31	34·70	27·81	7·96	107						
		2500	0·85	34·68	27·82	7·99	107	4·29					
		3000	0·71	34·67	27·82	8·00	104	4·27					
488	26	0	−0·49	33·96	27·31	8·05	78	—	N 70 B	111–0	0052	0112	KT
		10	−0·49	33·96	27·31	8·05	80	—	N 100 B				
		20	−0·48	33·96	27·31	8·05	81	—	N 100 B	370–111	0052	0120	DGP
		30	−0·45	33·96	27·31	8·05	82	—	N 50 V	100–0	0138		
		40	−0·45	33·96	27·31	8·05	82	—	N 70 V	50–0			
		50	−0·49	33·96	27·31	8·05	81	—	,,	100–50			
		60	−0·50	33·97	27·32	8·05	82	—	,,	250–100			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
488 *cont.*	52° 59¾′ S, 37° 48′ W	1930 17 xi											
489	52° 48¼′ S, 38° 04′ W	17 xi	0620	3251*	W × S	20	W × S	3	b. c.	1015·2	−0·4	−0·5	mod. W swell
			0937	—	W × S	20	W × S	4	b.	1016·5	−0·5	−0·7	,,
490	52° 35′ S, 38° 13½′ W	17 xi	1204	3502*	W	15–18	W	3	b. z. c.	1016·0	−1·0	−1·0	mod. WSW swell
			1535	—	WNW	15	WNW	3	o. f. e.	1015·7	−0·75	−0·75	,,
491	52° 22′ S, 38° 22¾′ W	17 xi	1843	3522*	NW	14	NW	3	c.	1015·3	−0·5	−0·5	mod. conf. swell
			2100	—	WNW	10	WNW	2	o. m. e.	1016·0	−0·6	−0·7	mod. conf. NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
488 *cont.*	26	80	−0·70	33·97	27·33	8·04	85	—	**N 70 V**	500–250			
		100	−0·80	34·02	27·37	8·00	101	—	,,	750–500			
		150	−0·01	34·13	27·43	7·94	101	—	,,	1000–750	—	**0331**	
		200	0·89	34·26	27·48	7·90	106						
		300	1·72	34·43	27·56	7·86	121						
		400	1·92	34·51	27·61	7·86	118						
		600	1·97	34·60	27·68	7·89	113						
		800	1·92	34·65	27·72	7·90	110						
		1000	1·75	34·68	27·76	7·98	107						
		1500	1·38	34·70	27·80	7·98	107						
		2000	0·91	34·70	27·83	7·97	107						
		2500	0·62	34·68	27·83	7·96	107						
		3000	0·43	34·66	27·83	8·00	108						
489	26	0	−0·79	33·91	27·28	8·04	85	7·87	**N 50 V**	100–0	0630		
		10	−0·79	33·91	27·28	8·04	89	—	**N 70 V**	50–0			
		20	−0·80	33·90	27·28	8·03	89	7·86	,,	100–50			
		30	−0·81	33·89	27·27	8·03	94	—	,,	250–100			
		40	−0·90	33·89	27·27	8·04	93	7·83	,,	500–250			
		50	−0·92	33·91	27·29	8·04	93	—	,,	750–500			
		60	−1·00	33·92	27·30	8·02	93	7·77	,,	1000–750	—	0925	
		80	−1·27	33·96	27·34	8·00	94	—	**N 70 B**	167–0	0950	1010	KT
		100	−1·28	34·04	27·40	7·96	97	7·14	**N 100 B**				
		150	−0·18	34·21	27·50	7·92	107	—	**N 100 B**	400–167	0950	1020	DGP
		200	0·40	34·31	27·55	7·87	111	5·52					
		300	1·70	34·50	27·61	7·87	113						
		400	1·80	34·58	27·67	7·91	114	4·08					
		600	1·95	34·66	27·73	7·96	114	3·88					
		800	1·90	34·68	27·75	7·95	106	3·94					
		1000	1·74	34·71	27·78	8·01	107						
		1500	1·29	34·72	27·82	7·97	105	4·16					
		2000	0·84	34·71	27·84	8·01	109						
		2500	0·51	34·70	27·86	8·03	114	4·30					
		3000	0·19	34·69	27·87	8·04	113	4·45					
490	27	0	−0·55	33·91	27·27	8·06	85	—	**N 50 V**	100–0	1211		
		10	−0·70	33·88	27·25	8·05	85	—	**N 70 V**	50–0			
		20	−0·70	33·89	27·26	8·05	93	—	,,	100–50			
		30	−0·70	33·89	27·26	8·05	91	—	,,	250–100			
		40	−0·78	33·89	27·27	8·05	88	—	,,	500–250			
		50	−0·84	33·89	27·27	8·04	85	—	,,	750–500			
		60	−0·87	33·90	27·28	8·03	85	—	,,	1000–750	—	1515	
		80	−1·15	33·92	27·30	7·98	93	—	**N 70 B**	140–0	1540	1601	KT
		100	−1·18	34·03	27·39	7·97	93	—	**N 100 B**				
		150	0·30	34·21	27·47	7·91	119	—	**N 100 B**	350–140	1540	1609	DGP
		200	0·98	34·32	27·52	7·88	114						
		300	1·77	34·48	27·59	7·85	120						
		400	1·90	34·57	27·66	7·86	118						
		600	1·96	34·66	27·73	7·88	114						
		800	1·86	34·66	27·73	7·93	111						
		1000	1·72	34·70	27·77	7·98	107						
		1500	1·22	34·70	27·81	7·97	107						
		2000	0·82	34·69	27·83	7·98	107						
		2500	0·56	34·68	27·84	7·98	107						
		3000	0·31	34·67	27·84	7·98	109						
491	27	0	−0·48	33·96	27·31	8·03	82	8·16	**N 50 V**	100–0	1849		
		10	−0·48	33·96	27·31	8·03	82	—	**N 70 V**	50–0			
		20	−0·62	33·96	27·32	8·02	93	8·23	,,	100–50			
		30	−0·68	33·96	27·32	8·02	83	—	,,	250–100			
		40	−0·70	33·96	27·32	8·02	85	8·01	,,	500–250			
		50	−0·78	33·96	27·32	8·02	85	—	,,	750–500			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
491 *cont.*	52° 22′ S, 38° 22¾′ W	1930 17 xi											
492	53° 12¾′ S, 37° 04¼′ W	18 xi	1030	3286*	NW	19	NW	3	b.	1014·2	2·3	1·5	mod. conf. NW swell
			1259	—	NNW	17	NNW	3	o. m. e.	—	1·8	1·5	mod. conf. W swell
493	52° 35¾′ S, 35° 26¼′ W	18–19 xi	2114	3824*	NNW	28	NNW	4	o p. m.	1006·7	2·5	2·5	mod. NW swell
			0115	—	NW	32	NW	4	o. m. r.	1003·0	3·0	3·0	,,
494	52° 50½′ S, 35° 35¾′ W	19 xi	0442	3760*	WNW	28	WNW	4–5	o. m.	999·1	1·8	1·7	heavy NW swell
			0810	—	WNW	29	WNW	4	o.	1000·2	0·2	0·0	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
491 *cont.*	27	60	−0·82	33·96	27·32	8·00	86	8·01	**N 70 V**	1000–750	—	2050	
		80	−0·89	33·96	27·33	8·01	87	—	**N 70 B**	164–0	**2121**	**2141**	KT
		100	−0·99	34·03	27·39	7·98	101	7·50	**N 100 B**				
		150	0·32	34·24	27·50	7·89	109	—	**N 100 B**	370–164	**2121**	**2153**	DGP
		200	0·92	34·33	27·53	7·87	110	5·21					
		300	1·67	34·49	27·61	7·84	112						
		400	1·92	34·58	27·66	7·85	119	4·03					
		600	1·94	34·68	27·74	7·91	118	3·96					
		800	1·84	34·70	27·77	7·92	114	3·96					
		1000	1·62	34·72	27·80	7·94	109						
		1500	1·23	34·72	27·83	7·98	107	4·19					
		2000	0·90	34·70	27·83	8·00	107						
		2500	0·61	34·69	27·84	7·98	107	4·53					
		3000	0·42	34·67	27·84	7·99	109	4·56					
492	28	0	0·35	33·96	27·30	8·05	72	—	**N 50 V**	100–0	1037		
		10	−0·43	33·96	27·31	8·04	73	—	**N 70 V**	50–0			
		20	−0·47	33·96	27·31	8·05	76	—	,,	100–50			
		30	−0·47	33·96	27·31	8·05	76	—	,,	250–100			
		40	−0·47	33·96	27·31	8·05	76	—	,,	500–250			
		50	−0·48	33·96	27·31	8·05	76	—	,,	750–500			
		60	−0·60	33·96	27·32	8·05	78	—	,,	1000–750	—	1230	
		80	−0·80	33·99	27·35	8·02	87	—	**N 70 B**	148–0	1312	1335	KT
		100	−0·83	34·03	27·38	7·98	90	—	**N 100 B**				
		150	−0·10	34·14	27·44	7·93	106	—	**N 100 B**	375–148	1312	1343	DGP
		200	0·94	34·40	27·59	7·88	111						
		300	1·72	34·47	27·59	7·84	114						
		400	1·92	34·58	27·66	7·85	114						
		600	1·98	34·66	27·73	7·88	118	3·81					
		800	1·89	34·67	27·74	7·91	116	3·91					
		1000	1·76	34·71	27·78	7·96	115						
		1500	1·40	34·72	27·82	7·98	114	3·14					
		2000	0·99	34·70	27·83	8·01	114						
		2500	0·71	34·69	27·84	8·00	111	3·93					
		3000	0·57	34·68	27·84	8·02	114	4·29					
493	28	0	0·35	33·95	27·26	8·07	84	—	**N 50 V**	100–0	**2130**		
		10	0·32	33·95	27·26	8·06	82	—	**N 70 V**	50–0			
		20	0·31	33·95	27·26	8·06	82	—	,,	100–50			
		30	0·31	33·95	27·26	8·07	82	—	,,	250–100			
		40	0·30	33·96	27·27	8·06	83	—	,,	500–250			
		50	0·30	33·99	27·30	8·05	90	—	,,	750–500			
		60	0·24	34·00	27·31	8·05	88	—	,,	1000–750	—	**2338**	
		80	0·21	34·01	27·32	8·04	88	—	**N 70 B**	155–0	**0135**	**0155**	KT
		100	0·10	34·01	27·32	8·04	88	—	**N 100 B**				
		150	−0·21	34·04	27·36	7·98	98	—	**N 100 B**	365–155	**0135**	**0207**	DGP
		175	0·79	34·30	27·52	7·90	104						
		200	1·33	34·40	27·56	7·88	109						
		300	1·79	34·54	27·64	7·86	111						
		400	1·99	34·60	27·68	7·87	111						
		600	1·90	34·67	27·74	7·90	126						
		800	1·79	34·71	27·78	7·93	124						
		1000	1·60	34·71	27·79	7·93	120						
		1500	1·25	34·72	27·83	8·00	115						
		2000	0·71	34·70	27·84	8·02	117						
		2500	0·47	34·70	27·86	8·01	118						
		3000	0·27	34·68	27·86	8·01	118						
		3500	—	34·67	—	8·01	118						
494	28	0	−0·85	33·96	27·32	8·00	89	7·81	**N 50 V**	100–0	0458		
		10	−0·85	33·96	27·32	8·00	89	—	**N 70 V**	50–0			
		20	−0·88	33·96	27·33	8·00	90	7·82	,,	100–50			

Depth	Nitrite N_2 mgm./m.³	Nitrate + Nitrite N_2 mgm./m.³
0	5·3	550
10	5·3	550
20	5·3	
30	5·3	550
40	5·5	
50	5·4	550
60	5·1	
80	4·7	550
100	4·3	600
150	1·7	700
200	0·3	700
300	0·0	
400	0·0	850
600	0·0	900
800	0·0	
1000	0·0	700
1500	0·0	
2000	0·0	700
2500	0·0	
3000	0·0	650

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
494 *cont.*	52° 50½′ S, 35° 35¾′ W	1930 19 xi											
495	53° 04¾′ S, 35° 43¾′ W	19 xi	1049	3528*	W × N	30	W × N	5	o. m.	1001·5	0·2	0·0	heavy conf. W swell
			1400	—	W × S	18	conf.	4	b.	1002·1	0·5	0·1	,,
496	53° 17¾′ S, 35° 56′ W	19 xi	1709	3466*	W	35	W	5	b. c. q.	1002·5	1·0	0·5	heavy conf. W swell
			2000	—	W	38	W	5	b. c. q.	1004·7	1·4	0·5	,,
497	3 miles S 60° E of Jason I, South Georgia	20 xi	0630	—	W	10	W	2	b. c.	1002·2	6·4	5·8	slight W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
494 *cont.*	29	30	−0·89	33·96	27·33	8·00	90	—	**N 70 V**	250–100			
		40	−0·90	33·96	27·33	8·00	90	7·77	,,	500–250			
		50	−0·90	33·96	27·33	8·00	90	—	,,	750–500			
		60	−1·08	33·96	27·33	7·99	90	7·73	,,	1000–750	—	0651	
		80	−1·39	34·03	27·40	7·98	91	—	**N 70 B**	160–0	0826	0846	KT
		100	−1·20	34·12	27·47	7·98	92	6·97	**N 100 B**				
		150	−0·22	34·22	27·51	7·96	105	—	**N 100 B**	390–160	0826	0858	DGP
		200	1·20	34·42	27·59	7·87	111	4·76					
		300	1·79	34·57	27·67	7·85	114						
		400	1·82	34·66	27·74	7·86	115	3·98					
		600	1·93	34·69	27·75	7·87	115	3·93					
		800	1·82	34·71	27·77	7·96	116	3·89					
		1000	1·53	34·73	27·81	7·95	116						
		1500	1·04	34·70	27·82	7·98	114	4·22					
		2000	0·61	34·69	27·84	8·03	111						
		2500	0·40	34·67	27·84	8·01	112	4·49					
		3000	0·22	34·67	27·85	8·02	113						
		3500	0·07	34·67	27·86	8·02	114	4·57					
495	29	0	−0·94	33·90	27·28	7·99	86	—	**N 50 V**	100–0	1105		
		10	−0·95	33·91	27·29	7·99	87	—	**N 70 V**	50–0			
		20	−0·95	33·91	27·29	7·99	87	—	,,	100–50			
		30	−0·96	33·91	27·29	8·00	86	—	,,	250–100			
		40	−0·97	33·91	27·29	8·00	86	—	,,	500–250			
		50	−1·02	33·92	27·30	7·99	85	—	,,	750–500			
		60	−1·04	33·93	27·31	7·99	86	—	,,	1000–750	—	1257	
		80	−1·13	33·96	27·34	7·98	90	—	**N 70 B**	155–0	1413	1433	KT
		100	−1·22	34·01	27·38	7·97	100	—	**N 100 B**	186–0	1413	1437	KT
		150	−0·30	34·19	27·49	7·89	103	—	,,	375–155	1413	1442	DGP
		200	1·24	34·41	27·58	7·85	114						
		300	1·82	34·56	27·65	7·84	114						
		400	1·89	34·59	27·67	7·85	114						
		600	1·85	34·66	27·73	7·87	109						
		800	1·73	34·71	27·78	7·90	110						
		1000	1·45	34·71	27·80	7·96	113						
		1500	0·98	34·71	27·84	7·98	114						
		2000	0·59	34·70	27·85	7·98	114						
		2500	0·38	34·69	27·86	8·00	114						
		3000	0·22	34·68	27·86	7·99	114						
496	29	0	−1·10	33·91	27·29	7·98	93	—	**N 50 V**	100–0	1716		
		10	−1·10	33·91	27·29	7·98	88	—	**N 70 V**	50–0			
		20	−1·10	33·91	27·29	7·97	89	—	,,	100–50			
		30	−1·10	33·91	27·29	7·97	89	—	,,	250–100			
		40	−1·10	33·91	27·29	7·98	92	—	,,	500–250			
		50	−1·40	33·95	27·33	7·97	93	—	,	750–500			
		60	−1·47	33·98	27·36	7·96	96	—	,,	1000–750	—	2000	
		80	−1·47	34·05	27·42	7·96	103	—	**N 70 B**	155–0	2019	2039	KT
		100	−1·38	34·07	27·43	7·96	106	—	**N 100 B**				
		150	−0·29	34·17	27·47	7·90	110	—	**N 100 B**	370–155	2019	2050	DGP
		200	1·05	34·31	27·51	7·86	111						
		300	1·75	34·50	27·61	7·83	114						
		400	2·01	34·60	27·67	7·84	116						
		600	2·02	34·63	27·70	7·87	118	4·02					
		800	1·90	34·68	27·75	7·90	112	4·17					
		1000	1·70	34·70	27·78	7·96	114						
		1500	1·26	34·70	27·81	7·98	114	4·11					
		2000	0·80	34·69	27·83	7·99	114						
		2500	0·48	34·68	27·84	7·98	118						
		3000	0·27	34·68	27·85	7·97	119	4·51					
497	0	0	−0·38	33·88	27·24	—	—	—	**N 50 V**	100–0	0635	0655	Two hauls

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
498	54° 00½′ S, 36° 22′ W	1930 21 xi	1400	185*	ESE	15	ESE	3	o.	1002·4	−0·5	−1·0	mod. ESE swell
499	53° 44½′ S, 36° 16′ W	21 xi	1640	386*	SE	5	SE	1	o.	1003·9	−0·5	−1·2	heavy SE swell
500	53° 30′ S, 36° 09½′ W	21 xi	1957	2081*	N	9	N	1	o.	1005·2	−1·5	−2·2	heavy SE swell
			2250	—	NW	18	NW	3	o.	1005·6	−1·5	−1·5	mod. conf. swell
501	53° 41½′ S, 33° 28′ W	22 xi	1415	2462*	W × N	12	W × N	2	o.	1001·1	1·2	0·8	mod. WNW swell
			1625	—	NW	15	NW	2	o.	999·7	−0·5	−0·6	mod. NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
498	1	0	−0·62	33·90	27·27	8·02	83	—	**N 50 V**	100–0	1407		
		10	−0·62	33·91	27·28	8·02	80	—	**N 70 V**	50–0			
		20	−0·62	33·91	27·28	8·02	77	—	,,	100–50			
		30	−0·68	33·91	27·28	8·02	76	—	,,	175–100	—	1440	
		40	−0·72	33·91	27·28	8·02	82	—	**N 70 B**	137–0	1450	1510	KT
		50	−0·92	33·91	27·29	8·00	82	—	**N 100 B**				
		60	−0·96	33·93	27·31	7·98	82						
		80	−1·14	33·94	27·32	7·96	89						
		100	−0·98	33·96	27·33	7·96	88						
		150	−0·51	34·10	27·42	7·95	93						
499	1	0	−0·62	33·91	27·28	8·02	76	7·94	**N 50 V**	100–0	1650		
		10	−0·62	33·91	27·28	8·02	75	—	**N 70 V**	50–0			
		20	−0·62	33·91	27·28	8·02	75	7·91	,,	100–50			
		30	−0·60	33·91	27·28	8·02	84	—	,,	250–100	—	1743	
		40	−0·60	33·91	27·28	8·02	82	7·95	**N 70 B**	155–0	1804	1824	KT
		50	−0·55	33·91	27·27	8·02	81	—	**N 100 B**				
		60	−0·53	33·91	27·27	8·02	81	7·91					
		80	0·98	33·95	27·32	7·97	85						
		100	−1·06	33·98	27·35	7·97	88	7·51					
		150	−0·13	34·12	27·42	7·91	93						
		200	0·47	34·22	27·47	7·88	106	5·65					
		300	1·25	34·36	27·54	7·87	106						
		350	1·55	34·43	27·57	7·87	109	4·49					
500	1	0	−0·78	33·92	27·29	8·02	78	7·85	**N 50 V**	100–0	2004		
		10	0·78	33·92	27·29	8·01	79	—	**N 70 V**	50–0			
		20	−0·79	33·92	27·29	8·01	82	7·84	,,	100–50			
		30	−0·80	33·92	27·29	8·01	83	—	,,	250–100			
		40	−0·81	33·92	27·29	8·00	83	7·84	,,	500–250			
		50	−0·83	33·92	27·29	8·00	88	—	,,	750–500			
		60	−0·88	33·92	27·29	7·98	88	7·80	,,	1000–750	—	**2250**	
		80	−0·94	33·93	27·31	7·97	90	—	**N 70 B**	142–0	**2308**	**2328**	KT
		100	−0·89	34·01	27·37	7·96	107	7·05	**N 100 B**				
		150	0·38	34·17	27·48	7·89	107	—	**N 100 B**	390–142	**2308**	**2337**	DGP
		200	1·28	34·30	27·49	7·86	109	5·02					
		300	1·68	34·43	27·56	7·84	114						
		400	1·98	34·54	27·63	7·86	114	3·99					
		600	2·01	34·61	27·68	7·96	112	3·86					
		800	1·93	34·65	27·72	7·97	113	3·73					
		1000	1·83	34·65	27·73	7·96	111						
		1500	1·38	34·66	27·77	7·97	111	4·10					
		2000	1·03	34·67	27·80	7·97	110	4·23					
501	2	0	−0·93	33·87	27·26	7·99	94	—	**N 50 V**	100–0	1424		
		5	−0·93	—	—	7·99	—	—	**N 70 V**	50–0			
		10	−0·99	33·87	27·26	7·98	104	—	,,	100–50			
		15	−1·00	—	—	7·98	—	—	,,	250–100			
		20	−1·01	33·87	27·26	7·98	106	—	,,	500–250			
		25	−1·00	—	—	7·98	—	—	,,	750–500			
		30	−1·00	33·87	27·26	7·98	103	—	,,	1000–750	—	1621	
		40	−0·99	33·89	27·27	7·98	104	—	**N 70 B**	200–0	1652	1712	KT
		50	−1·01	33·90	27·28	7·97	104	—	**N 100 B**				
		60	−1·06	33·93	27·31	7·97	104	—	**N 100 B**	490–200	1652	1720	DGP
		80	−0·55	34·11	27·44	7·92	106						
		100	0·01	34·20	27·48	7·87	123						
		150	0·87	34·33	27·54	7·86	125						
		200	1·55	34·45	27·59	7·84	135						
		300	1·90	34·54	27·63	7·82	135						
		400	1·95	34·61	27·69	7·87	130						
		600	1·79	34·69	27·76	7·93	126						
		800	1·54	34·70	27·79	7·95	127						

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
501 *cont.*	53° 41½′ S, 33° 28′ W	1930 22 xi											
502	53° 47′ S, 33° 51¾′ W	22 xi	1858	2661*	NW	10	NW	2	b. c.	999·8	0·5	0·8	mod. WNW swell
			2105	—	NW	19	NW	2	o.	999·4	−0·5	−1·0	,,
503	53° 53¾′ S, 34° 12¾′ W	23 xi	0000	2823*	W × N	18	W × N	3	b. c.	996·7	0·5	0·6	mod. conf. swell
			0250	—	NW × W	20	NW × W	3	o.	994·1	−1·0	−0·8	mod. NW swell
504	54° 00¾′ S, 34° 33½′ W	23 xi	0539	3125*	NW × W	21	NW × W	4	o. p. s.	991·6	−0·7	−1·0	heavy WNW swell
			0758	—	NW × W	20	NW × W	4	o. c. m.	991·4	−0·2	−0·2	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
501 *cont.*	2	1000	1·33	34·70	27·80	7·97	120						
		1500	0·79	34·69	27·83	7·98	114						
		2000	0·42	34·69	27·85	7·97	112						
502	2	0	−0·80	33·82	27·21	8·00	91	7·83	**N 50 V**	100–0	1910		
		10	−0·80	33·82	27·21	8·00	95	—	**N 70 V**	50–0			
		20	−0·80	33·82	27·21	8·00	100	—	,,	100–50			
		30	−0·89	33·82	27·21	8·00	97	—	,,	250–100			
		40	−0·90	33·83	27·22	7·99	96	7·84	,,	500–250			
		50	−1·07	33·85	27·25	7·98	93	—	,,	750–500			
		60	−1·07	33·91	27·29	7·98	91	7·69	,,	1000–750	—	2050	
		80	−1·28	34·00	27·37	7·97	96	—	**N 70 B**	132–0	**2129**	**2149**	KT
		100	−1·25	34·05	27·41	7·96	99	7·03	**N 100 B**				
		150	1·16	34·36	27·54	7·87	112	—	**N 100 B**	370–132	**2129**	**2200**	DGP
		200	1·77	34·47	27·59	7·84	113	4·24					
		300	1·88	34·55	27·64	7·85	114						
		400	1·79	34·63	27·71	7·86	115	4·02					
		600	1·78	34·67	27·75	7·89	115	4·01					
		800	1·52	34·69	27·78	7·95	118	3·12					
		1000	1·25	34·70	27·81	7·98	116						
		1500	0·81	34·71	27·85	8·00	116	4·33					
		2000	0·47	34·69	27·85	8·01	115						
		2500	0·21	34·68	27·86	7·99	115	4·23					
503	3	0	−1·12	33·89	27·28	8·00	89	—	**N 50 V**	100–0	**0016**		
		10	−1·16	33·89	27·28	8·00	89	—	**N 70 V**	50–0			
		20	−1·17	33·89	27·28	8·00	93	—	,,	100–50			
		30	−1·27	33·90	27·29	7·99	93	—	,,	250–100			
		40	−1·27	33·92	27·31	7·99	93	—	,,	500–250			
		50	−1·27	33·92	27·31	7·98	93	—	,,	750–500			
		60	−1·33	33·93	27·32	7·98	94	—	,,	1000–750	—	**0212**	
		80	−1·59	33·97	27·36	7·96	100	—	**N 70 B**	115–0	**0316**	0336	KT
		100	−1·28	34·07	27·43	7·93	109	—	**N 100 B**				
		150	0·10	34·27	27·53	7·90	115	—	**N 100 B**	320–115	**0316**	0347	DGP
		200	1·40	34·47	27·61	7·86	120						
		300	1·70	34·61	27·70	7·84	128						
		400	1·70	34·63	27·72	7·85	129						
		600	1·71	34·69	27·77	7·88	125						
		800	1·57	34·71	27·79	7·93	121						
		1000	1·31	34·70	27·81	7·94	118						
		1500	0·81	34·69	27·83	7·98	117						
		2000	0·42	34·69	27·85	7·97	118						
		2500	0·21	34·69	27·87	7·98	128						
504	3	0	−1·31	33·91	27·30	8·00	93	7·64	**N 50 V**	100–0	0604		
		10	−1·33	33·91	27·30	7·99	94	—	**N 70 V**	50–0			
		20	−1·39	33·89	27·29	7·98	93	7·60	,,	100–50			
		30	−1·41	33·89	27·29	7·98	91	—	,,	250–100			
		40	−1·44	33·89	27·29	7·98	98	7·60	,,	500–250			
		50	−1·41	33·89	27·29	7·98	96	—	,,	750–500			
		60	−1·40	33·90	27·30	7·97	96	7·57	,,	1000–750	—	0740	
		80	−1·48	33·91	27·31	7·97	94	—	**N 70 B**	169–0	0817	0837	KT
		100	−1·52	33·93	27·32	7·97	93	7·41	**N 100 B**				
		150	−1·32	34·14	27·49	7·93	97	—	**N 100 B**	400–169	0817	0850	DGP
		200	0·45	34·35	27·58	7·87	110	5·17					
		300	1·16	34·51	27·66	7·86	120						
		400	1·65	34·58	27·68	7·86	115	4·75					
		600	1·66	34·68	27·76	7·88	114						
		800	1·52	—	—	7·94	—	4·04					
		1000	1·32	34·71	27·81	7·95	110						
		1500	0·87	34·70	27·83	7·96	110	4·27					
		2000	0·59	34·69	27·85	7·96	110						

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
504 *cont.*	54° 00¾′ S, 34° 33½′ W	1930 23 xi											
505	54° 07¼′ S, 34° 54¾′ W	23 xi	1040	3872*	NW	12	NW	3	o. f. c.	990·0	0·0	0·0	heavy NW swell
			1310	—	WNW	19	NW × W	3	o. m. c.	990·2	0·2	0·0	heavy WNW swell
506	54° 14′ S, 35° 15½′ W	23 xi	1556	1366*	WNW	20	WNW	4	o. m. c.	988·1	− 0·1	− 0·1	heavy NW × W swell
			1622	1192*									
			1750	—	WNW	13	WNW	4	o. f. c.	987·9	0·2	0·2	heavy conf. W swell
507	54° 19½′ S, 35° 33½′ W	23 xi	2105	157*	NW × N	28	NW	4–5	o. c. g.	984·6	0·2	0·2	heavy NW swell
508	55 08′ S, 33° 35′ W	24 xi	1123	3405*	W × S	24	W × S	4	o.	978·5	− 0·3	− 0·7	mod. conf. W swell
			1420	—	W	30	W	4	o.	980·3	− 0·2	− 0·5	mod. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
504 *cont.*	3	2500	0·31	34·68	27·85	7·98	109	4·47					
		3000	0·07	34·67	27·86	8·00	112	4·53					
505	3	0	−0·68	33·90	27·27	8·05	86	—	N 50 V	100–0	1050		
		10	−0·70	33·90	27·27	8·05	80	—	N 70 V	50–0			
		20	−0·73	33·90	27·27	8·05	81	—	,,	100–50			
		30	−0·81	33·90	27·27	8·05	85	—	,,	250–100			
		40	−0·81	33·91	27·28	8·04	84	—	,,	500–250			
		50	−0·82	33·91	27·28	8·04	85	—	,,	750–500			
		60	0·86	33·91	27·29	8·03	85	—	,,	1000–750	—	1224	
		80	0·78	33·94	27·31	7·99	86	—	N 70 B	141–0	1332	1352	KT
		100	0·70	34·01	27·36	7·97	101	—	N 100 B				
		150	−0·31	34·14	27·45	7·95	104	—	N 100 B	360–140	1332	1401	DGP
		200	0·40	34·28	27·52	7·89	106						
		300	1·29	34·43	27·59	7·86	107						
		400	1·73	34·54	27·64	7·84	108						
		600	1·81	34·64	27·72	7·88	109						
		800	1·72	34·69	27·77	7·90	109						
		1000	1·56	34·70	27·79	7·92	109						
		1500	1·03	34·70	27·82	7·97	108						
		2000	0·68	34·69	27·84	7·99	106						
		2500	0·45	34·69	27·85	7·99	106						
		3000	0·40	34·69	27·85	8·01	107						
		3500	0·24	34·68	27·85	8·01	108						
506	3	0	−0·56	33·92	27·28	8·07	81	7·85	N 50 V	100–0	1611		
		10	−0·59	33·92	27·28	8·05	81	—	N 70 V	50–0			
		20	−0·60	33·92	27·28	8·05	81	7·75	,,	100–50			
		30	−0·60	33·89	27·26	8·05	81	—	,,	250–100			
		40	−0·62	33·89	27·26	8·04	85	7·84	,,	500–250			
		50	−0·78	33·89	27·27	8·04	85	—	,,	750–500			
		60	−0·80	33·90	27·28	8·03	86	7·63	,,	1000–750	—	1744	
		80	−0·80	33·92	27·29	8·00	87	—	N 70 B	161–0	1803	1823	KT
		100	−0·80	34·03	27·38	7·97	94	7·10	N 100 B				
		150	−0·16	34·14	27·44	7·90	103	—	N 100 B	430–161	1803	1831	DGP
		200	0·48	34·23	27·48	7·87	103	5·56					
		300	1·60	34·43	27·57	7·86	112						
		400	1·97	34·56	27·65	7·85	113	3·97					
		600	2·02	34·66	27·72	7·87	112	3·87					
		800	1·85	34·69	27·76	7·92	108	4·01					
		1000	1·69	34·71	27·79	7·94	109	4·03					
507	3	0	−0·70	33·91	27·28	8·02	87	—	N 50 V	100–0	1913		
		10	−0·70	33·91	27·28	8·02	87	—	N 70 V	50–0			
		20	−0·72	33·91	27·28	8·02	87	—	,,	100–50	—	1935	
		30	−0·72	33·91	27·28	8·02	87	—	N 70 B	75–0	2012	2032	
									N 100 B				
		40	−0·77	33·91	27·28	8·01	88						
		50	−0·78	33·91	27·28	8·01	91						
		60	−0·79	33·91	27·28	7·99	93						
		80	−0·98	33·96	27·33	7·97	114						
		100	−0·86	34·00	27·36	7·97	108						
		150	−0·27	34·09	27·40	7·92	106						
508	4	0	−0·92	33·75	27·16	8·04	71	8·07	N 50 V	100–0	1135		
		10	−0·97	33·75	27·16	8·03	75	—	N 70 V	50–0			
		20	−0·99	33·75	27·16	8·02	75	8·07	,,	100–50			
		30	−1·00	33·75	27·16	8·03	75	—	,,	250–100			
		40	−1·01	33·83	27·23	8·02	76	7·86	,,	500–250			
		50	−1·07	33·87	27·26	8·01	78	—	,,	750–500			
		60	−1·02	33·87	27·26	8·00	80	7·71	,,	1000–750	—	1313	
		80	−1·05	33·87	27·26	7·97	80	—	N 70 B	181–0	1440	1500	KT

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. °C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
508 *cont.*	55° 08′ S, 33° 35′ W	1930 24 xi											
509	55° 05½′ S, 34° 01′ W	24 xi	1708	1666*	WSW	29	WSW	5	o. q.	981·4	−0·5	−0·9	heavy W swell
			2035	—	W S	32	W S	5	o. q.	983·5	−1·0	−1·0	,,
510	4·8 miles N 70° E of Clerke Rocks, South Georgia	25 xi	0720	166*	WSW	20	WSW	4	o. m.	986·8	0·0	0·0	mod. WSW swell
511	54° 58¼′ S, 34° 51¼′ W	25 xi	1020	117	SW	16	SW	2	o.	986·1	−0·5	−0·5	mod. W swell
512	54° 56′ S, 35° 17′ W	25 xi	1310	137*	WNW	8	WNW	2	c.	986·0	0·7	0·0	mod. conf. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
508 *cont.*	4	100	−1·00	33·96	27·33	7·97	86	7·55	**N 100 B**	181–0	1440	1500	KT
		150	0·00	34·13	27·43	7·94	99	—	,,	410–181	1440	1515	DGP
		200	0·76	34·24	27·47	7·90	102	5·55					
		300	1·75	34·47	27·59	7·86	107						
		400	1·92	34·56	27·65	7·87	107	4·01					
		600	2·02	34·65	27·71	7·91	107	3·93					
		800	2·02	34·70	27·75	7·91	106	3·92					
		1000	1·76	34·72	27·79	7·92	106						
		1500	1·21	34·72	27·83	7·97	104	4·23					
		2000	0·66	34·70	27·85	7·99	106						
		2500	0·39	34·69	27·85	7·97	107	4·63					
		3000	0·25	34·69	27·86	7·99	108	4·64					
509	4	0	−0·81	33·80	27·20	8·06	75	—	**N 50 V**	100–0	1720		
		10	−0·82	33·80	27·20	8·06	75	—	**N 70 V**	50–0			
		20	−0·83	33·80	27·20	8·06	75	—	,,	100–50			
		30	−0·90	33·81	27·21	8·05	75	—	,,	250–100			
		40	−0·89	33·87	27·25	8·04	77	—	,,	500–250			
		50	−0·89	33·87	27·25	8·04	78	—	,,	750–500			
		60	−0·89	33·87	27·25	8·05	85	—	,,	1000–750	—	1946	
		80	−0·89	33·93	27·30	8·03	87	—	**N 70 B**	112–0	2003	2023	KT
		100	−0·80	33·99	27·35	7·98	95	—	**N 100 B**				
		150	0·02	34·14	27·43	7·95	102	—	**N 100 B**	340–112	2003	2035	DGP
		200	0·80	34·23	27·46	7·89	108						
		300	1·71	34·42	27·55	7·85	113						
		400	1·93	34·51	27·60	7·84	116						
		600	2·04	34·67	27·73	7·91	116						
		800	1·95	34·69	27·75	7·90	115						
		1000	1·72	34·70	27·77	7·92	109						
		1500	1·36	34·73	27·83	7·96	107						
510	5	0	−0·88	33·86	27·24	8·06	79	7·90	**N 50 V**	100–0	0728		
		10	−0·87	33·86	27·24	8·06	80	—	**N 70 V**	50–0			
		20	−0·89	33·86	27·25	8·06	85	7·88	,,	100–50			
		30	−0·90	33·86	27·25	8·06	85	—	,,	150–100	—	0755	
		40	−0·90	33·88	27·26	8·06	85	7·84	**N 70 B**	149–0	0817	0837	KT
		50	−0·86	33·91	27·29	8·05	86	—	**N 100 B**				
		60	−0·83	33·94	27·31	8·03	88	7·71					
		80	−0·98	34·01	27·37	8·00	100						
		100	−0·77	34·03	27·38	7·97	101	6·98					
		150	−0·74	34·05	27·39	7·98	102	6·94					
511	5	0	−0·85	33·87	27·25	8·05	81	—	**N 50 V**	100–0	1025		
		10	−0·90	33·87	27·25	8·05	85	—	**N 70 V**	50–0			
		20	−0·91	33·87	27·26	8·05	86	—	,,	100–50	—	1047	
		30	−0·92	33·87	27·26	8·05	86	—	**N 70 B**	71–0	1115	1135	KT
		40	−0·92	33·87	27·26	8·03	87	—	**N 100 B**				
		50	−0·92	33·88	27·26	8·03	91						
		60	−0·92	33·89	27·26	8·03	91						
		80	−0·93	33·89	27·27	8·03	88						
		100	−0·96	33·90	27·28	8·03	87						
512	5	0	−0·55	33·87	27·24	8·07	79	8·08	**N 50 V**	100–0	1320		
		10	−0·60	33·87	27·24	8·07	79	—	**N 70 V**	50–0			
		20	−0·69	33·87	27·25	8·07	79	8·02	,,	100–50	—	1345	
		30	−0·70	33·87	27·25	8·07	80	—	**N 70 B**	137–0	1410	1430	KT
		40	−0·71	33·87	27·25	8·07	83	8·03	**N 100 B**				
		50	−0·71	33·87	27·25	8·06	83						
		60	−0·71	33·87	27·25	8·06	79	7·98					
		80	−0·71	33·87	27·25	8·06	81						
		100	−0·73	33·87	27·25	8·05	85	8·01					
		140	−0·79	33·87	27·25	8·04	84	7·95					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
513	54° 53¾′ S, 35° 42½′ W	1930 25 xi	1600	106*	N	17	N	3	o. m. e.	985·4	−0·2	−0·2	mod. N swell
514	55° 51′ S, 35° 32′ W	26 xi	0630	3133*	W	18	W	2	o. f. e.	987·0	−0·5	−0·5	slight W swell
			0822	—	WSW	16	WSW	3	o. p. s. e.	989·3	−1·0	−1·2	slight WSW swell
515	55° 38¾′ S, 35° 41′ W	26 xi	0952	1849*	W	22	W	3	o.	990·5	−0·8	−1·5	mod. W swell
			1128	—	W	20	W	3	b. c.	991·4	−0·5	−1·0	,,
516	55° 25½′ S, 35° 52¾′ W	26 xi	1356	454*	W × N	20	W × N	3	o.	992·3	−0·5	−0·5	mod. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
513	5	0	0·42	33·87	27·23	8·07	81	—	**N 50 V**	90–0	1606		
		10	–0·42	33·87	27·23	8·07	81	—	**N 70 V**	50–0			
		20	–0·45	33·87	27·23	8·06	81	—	,,	90–50	—	1626	
		30	–0·56	33·87	27·24	8·06	84	—	**N 70 B**	71–0	1651	1711	KT
		40	0·58	33·87	27·24	8·06	81	—	**N 100 B**				
		50	–0·59	33·87	27·24	8·06	83						
		60	–0·60	33·87	27·24	8·06	84						
		80	–0·63	33·87	27·25	8·06	85						
		100	–0·68	33·91	27·28	8·06	88						
514	6	0	–0·39	33·88	27·24	8·06	80	7·96	**N 70 B**	155–0	0540	0600	KT
		10	–0·39	33·88	27·24	8·06	80	—	**N 100 B**				
		20	–0·45	33·88	27·24	8·05	82	7·89	**N 100 B**	390–155	0540	0612	
		30	–0·50	33·88	27·25	8·05	83	—	**N 50 V**	100–0	0625		
		40	–0·61	33·91	27·28	8·04	91	7·67	**N 70 V**	50–0			
		50	–0·95	33·96	27·33	8·01	93	—	,,	100–50			
		60	–1·18	34·04	27·40	7·98	100	7·19	,,	250–100			
		80	–0·53	34·13	27·45	7·93	108	—	,,	500–250			
		100	–0·61	34·14	27·46	7·94	108	6·48	,,	750–500			
		150	0·07	34·23	27·50	7·91	108	—	,,	1000–750	—	0755	
		200	0·88	34·32	27·53	7·90	113	5·11					
		300	1·98	34·52	27·61	7·86	125						
		400	2·01	34·58	27·66	7·87	118	3·88					
		600	1·83	34·66	27·73	7·91	118	3·93					
		800	1·73	34·69	27·77	7·96	114	4·00					
		1000	1·63	34·71	27·79	7·96	119						
		1500	1·14	34·71	27·83	8·01	111	4·16					
		2000	0·70	34·70	27·85	7·98	109						
		2500	0·43	34·68	27·85	8·00	109	4·51					
		3000	0·22	34·67	27·85	7·99	107	4·60					
515	6	0	–0·30	33·88	27·24	8·06	75	—	**N 50 V**	100–0	1002		
		10	–0·31	33·88	27·24	8·06	75	—	**N 70 V**	50–0			
		20	0·38	33·88	27·24	8·06	75	—	,,	100–50			
		30	–0·40	33·88	27·24	8·06	74	—	,,	250–100			
		40	–0·46	33·88	27·24	8·06	75	—	,,	500–250			
		50	0·49	33·88	27·25	8·06	76	—	,,	750–500			
		60	–0·68	33·93	27·29	8·02	79	—	,,	1000–750	—	1125	
		80	0·82	33·96	27·32	7·99	84	—	**N 70 B**	106–0	1145	1205	KT
		100	–0·50	34·05	27·38	7·96	97	—	**N 100 B**				
		150	0·68	34·23	27·47	7·87	100	—	**N 100 B**	340–106	1145	1215	DGP
		200	1·11	34·32	27·51	7·86	103						
		300	1·40	34·39	27·55	7·86	107						
		400	2·09	34·63	27·69	7·86	108						
		600	2·06	34·65	27·71	7·90	109						
		800	1·96	34·68	27·74	7·92	104						
		1000	1·82	34·67	27·74	7·90	105						
		1500	1·48	34·68	27·78	7·96	105						
516	6	0	–0·50	33·89	27·25	8·06	83	7·89	**N 50 V**	100–0	1400		
		10	–0·50	33·90	27·26	8·06	83	—	**N 70 V**	50–0			
		20	–0·50	33·90	27·26	8·07	83	8·06	,,	100–50			
		30	–0·50	33·90	27·26	8·06	86	—	,,	250–100			
		40	–0·52	33·93	27·29	8·06	86	8·01	,,	440–250	—	1445	
		50	–0·51	33·93	27·29	8·06	82	—	**N 70 B**	123–0	1520	1540	KT
		60	–0·69	33·93	27·29	8·03	90	7·79	**N 100 B**				
		80	–0·85	33·98	27·34	8·00	100						
		100	–0·72	34·07	27·41	7·97	113	6·96					
		150	0·12	34·21	27·48	7·90	115						
		200	0·90	34·30	27·51	7·87	117	5·30					
		300	1·51	34·42	27·57	7·84	123						
		400	1·90	34·52	27·62	7·86	120	4·04					

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Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
517	54° 42¾′ S, 36° 36¾′ W	1930 26 xi	2108	187	NNW	12	NNW	2	o. r. s.	991·0	1·4	1·4	mod. W swell
518	54° 58′ S, 36° 23′ W	27 xi	0008	294*	NW × W	19	NW × W	3	o. r.	989·5	1·0	0·9	mod. W swell
519	55° 13′ S, 36° 09½′ W	27 xi	0312 0510	1095* 1077*	NW × W	18	NW × W	3	o. p. s.	987·9	0·7	0·5	mod. W swell
520	55° 49′ S, 39° 07¼′ W	28 xi	0327	2783*	WNW	16	WNW	3	o. p. m.	988·1	0·0	0·0	heavy NW × N swell
			0536	—	NW × N	15	NW × N	3	o. f. e.	988·1	− 1·0	− 1·0	heavy NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
517	7	0	0·30	33·87	27·20	8·17	64	—	**N 50 V**	100–0	**2123**		
		10	0·29	33·87	27·20	8·17	67	—	**N 70 V**	50–0			
		20	0·08	33·87	27·22	8·16	68	—	,,	100–50			
		30	−0·09	33·87	27·22	8·13	68	—	,,	180–100	—	**2154**	
		40	0·10	33·87	27·22	8·12	70	—	**N 70 B**	102–0	**2216**	**2236**	KT
		50	−0·40	33·89	27·25	8·09	83	—	**N 100 B**				
		60	0·50	33·92	27·28	8·07	84						
		80	−0·79	33·94	27·31	7·97	96						
		100	−0·76	33·97	27·33	7·95	104						
		150	−0·50	34·05	27·38	7·92	109						
		175	−0·41	34·06	27·39	7·91	110						
518	7	0	0·10	33·90	27·24	8·11	74	8·26	**N 50 V**	100–0	**0014**		
		10	−0·10	33·90	27·24	8·11	76	—	**N 70 V**	50–0			
		20	0·19	33·91	27·26	8·07	76	8·16	,,	100–50			
		30	−0·20	33·92	27·26	8·06	78	—	,,	250–100	—	**0048**	
		40	−0·33	33·97	27·31	8·03	83	7·91	**N 70 B**	90–0	**0119**	**0139**	
		50	0·40	33·97	27·32	8·02	84	—	**N 100 B**				
		60	−0·41	33·97	27·32	8·00	88	7·80					
		80	−0·58	33·97	27·32	8·00	91						
		100	0·84	34·02	27·37	7·98	100	7·51					
		150	−0·09	34·15	27·44	7·91	109						
		200	0·50	34·28	27·52	7·87	114	5·58					
		250	1·00	34·37	27·56	7·85	114						
519	7	0	−0·21	33·91	27·26	8·10	81	—	**N 50 V**	100–0	0320		
		10	−0·21	33·91	27·26	8·08	79	—	**N 70 V**	50–0			
		20	−0·21	33·91	27·26	8·07	78	—	,,	100–50			
		30	0·25	33·92	27·27	8·05	82	—	,,	250–100			
		40	−0·30	33·92	27·27	8·05	85	—	,,	500–250			
		50	−0·32	33·92	27·27	8·04	83	—	,,	750–500			
		60	−0·38	33·93	27·28	8·02	91	—	,,	1000–750	—	0457	
		80	−0·64	33·95	27·31	8·00	91	—	**N 70 B**	137–0	0531	0551	KT
		100	−0·70	33·98	27·33	7·97	96	—	**N 100 B**				
		150	−0·51	34·08	27·41	7·93	109	—	**N 100 B**	390–137	0531	0604	DGP
		200	0·32	34·21	27·47	7·90	112						
		300	1·45	34·40	27·55	7·85	114						
		400	1·71	34·49	27·61	7·84	119						
		600	2·03	34·65	27·71	7·87	116						
		800	2·03	34·69	27·74	7·90	115						
520	8	0	−0·46	33·88	27·25	8·07	79	7·87	**N 70 B**	155–0	0253	0318	KT
		10	−0·49	33·88	27·25	8·07	79	—	**N 100 B**				
		20	−0·49	33·88	27·25	8·07	79	7·89	**N 100 B**	400–155	0253	0328	DGP
		30	−0·49	33·88	27·25	8·07	79	—	**N 50 V**	100–0	0338		
		40	−0·54	33·89	27·26	8·07	79	7·89	**N 70 V**	50–0			
		50	−1·00	33·94	27·32	8·05	79	—	,,	100–50			
		60	−1·20	33·99	27·36	8·02	89	7·51	,,	250–100			
		80	1·10	34·09	27·44	7·97	96	—	,,	500–250			
		100	−0·22	34·24	27·53	7·94	97	5·96	,,	750–500			
		150	1·12	34·40	27·58	7·87	100	—	,,	1000–750	—	0504	
		200	1·50	34·49	27·62	7·86	103	4·35					
		300	1·80	34·58	27·67	7·86	106						
		400	1·95	34·67	27·73	7·87	114	3·93					
		600	1·77	34·69	27·76	7·91	112	3·94					
		800	1·58	34·70	27·79	7·97	106	4·00					
		1000	1·40	34·72	27·81	8·01	104						
		1500	0·87	34·72	27·85	8·00	106	4·29					
		2000	0·50	34·70	27·86	8·05	106						
		2500	0·25	34·69	27·86	8·05	106	4·54					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. °C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
521	55° 34½′ S, 38° 43′ W	1930 28 xi	0900	3513*	NW × N	14	NW × N	2	o. f. e.	988·4	−1·0	−1·0	mod. WNW swell
			1233	—	SE	3	—	0–1	o. f. e.	984·2	0·0	0·0	,,
522	55° 20½′ S, 38° 19′ W	28 xi	1547	3846*	SE	25–30	SE	4	o. f. e.	976·4	−0·8	−0·8	heavy conf. swell
			1922	—	SE × S	27–30	SE	5	o. s.	967·4	−0·8	−0·6	,,
523	55° 08¾′ S, 37° 49¾′ W	29 xi	0440	3685*	SSW	16	SSW	3	o.	978·8	−0·3	−0·5	heavy conf. S swell
			0840	3008*									
			0916	—	WNW	12	W	2	o.	989·5	−0·5	−0·6	heavy conf. swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
521	8	0	−0·68	33·86	27·24	8·05	78	—	**N 50 V**	100–0	0909		
		10	−0·70	33·86	27·24	8·04	75	—	**N 70 V**	50–0			
		20	0·75	33·86	27·24	8·04	75	—	,,	100–50			
		30	0·78	33·86	27·24	8·04	73		,,	250–100			
		40	0·80	33·86	27·24	8·04	77	—	,,	500–250			
		50	0·82	33·86	27·24	8·04	78		,,	750–500			
		60	1·08	33·87	27·26	8·01	81	—	,,	1000–750	—	1031	
		80	1·31	34·06	27·42	7·97	89		**N 70 B**	164–0	1200	1220	KT
		100	1·17	34·14	27·48	7·95	93	—	**N 100 B**				
		150	0·70	34·34	27·56	7·88	103		**N 100 B**	420–164	1200	1230	DGP
		200	1·08	34·43	27·60	7·86	104						
		300	1·78	34·57	27·67	7·84	108						
		400	1·85	34·60	27·68	7·86	112						
		600	1·87	34·68	27·75	7·90	109						
		800	1·74	34·72	27·79	7·91	109						
		1000	1·34	34·72	27·82	7·97	107						
		1500	0·92	34·70	27·83	7·97	106						
		2000	0·61	34·70	27·85	7·98	106						
		2500	0·30	34·69	27·86	8·00	106						
		3000	0·22	34·68	27·86	7·99	107						
522	8	0	−0·20	33·89	27·24	8·08	79	7·88	**N 50 V**	100–0	1549		
		10	−0·21	33·89	27·24	8·08	79	—	**N 70 V**	50–0			
		20	−0·23	33·89	27·24	8·07	79	7·93	,,	100–50			
		30	−0·28	33·89	27·25	8·08	83	—	,,	250–100			
		40	−0·38	33·89	27·25	8·07	83	7·87	,,	500–250			
		50	−0·44	33·93	27·28	8·04	83	—	,,	750–500			
		60	−0·71	33·95	27·31	8·02	95	7·78	,,	1000–750	—	1711	
		80	−0·98	33·98	27·35	8·00	100	—	**N 70 B**	95–0	1937	1957	KT. N 70 net torn, catch lost
		100	−1·01	34·05	27·40	7·96	108	7·07	**N 100 B**				
		150	−0·02	34·23	27·50	7·91	114	—	**N 100 B**	300–95	1937	2006	DGP
		200	0·57	34·31	27·54	7·90	114	5·43					
		300	1·50	34·44	27·58	7·86	116						
		400	2·00	34·56	27·64	7·85	118	4·31					
		600	1·96	34·66	27·72	7·97	117						
		800	1·90	34·69	27·75	8·01	114	3·66					
		1000	1·78	34·70	27·77	8·02	117						
		1500	1·33	34·70	27·80	7·98	112	4·13					
		2000	0·93	34·70	27·83	8·02	114						
		2500	0·58	34·69	27·85	8·01	114	4·01					
		3000	0·29	34·69	27·86	8·02	114						
		3500	0·09	34·69	27·87	8·02	113	4·72					
523	9	0	−0·30	33·88	27·24	8·07	82	—	**N 50 V**	100–0	0445		
		10	−0·30	33·88	27·24	8·07	82	—	**N 70 V**	50–0			
		20	−0·30	33·88	27·24	8·07	82	—	,,	100–50			
		30	−0·30	33·88	27·24	8·07	82	—	,,	250–100			
		40	−0·30	33·89	27·25	8·07	82	—	,,	500–250			
		50	−0·33	33·89	27·25	8·05	81	—	,,	750–500			
		60	−0·62	33·94	27·30	8·03	85	—	,,	1000–750	—	0625	
		80	−0·92	33·98	27·34	8·00	97	—	**N 70 B**	157–0	0413	0433	KT
		100	−0·98	34·05	27·40	7·96	101	—	**N 100 B**				
		150	−0·40	34·14	27·45	7·91	123						
		200	0·69	34·31	27·53	7·87	122						
		300	1·56	34·44	27·58	7·85	124						
		400	1·81	34·53	27·63	7·85	124						
		600	2·00	34·62	27·69	7·92	120						
		800	1·92	34·68	27·74	7·97	122						
		1000	1·84	34·69	27·76	7·97	114						
		1500	1·40	34·70	27·80	7·97	111						
		2000	0·92	34·69	27·82	8·00	115						
		2500	0·53	34·69	27·85	7·98	117						

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
524	54° 55½′ S, 37° 25½′ W	1930 29 xi	1137	181*	NW	15	conf.	2	o.	993·5	0·0	−0·5	slight conf. swell
525	54° 36¼′ S, 37° 23½′ W	29 xi	1450	155*	NW × N	10	NW × N	2–3	o. s.	995·3	0·5	0·2	mod. conf. swell
526	3 miles S 60° E of Jason I, South Georgia	10 xii	1724	—	NNE	5	NNE	1	c. f.	999·1	0·2	0·2	mod. conf. N swell
527	54° 09¼′ S, 34° 29½′ W	11 xii	2213	4385*	WNW	7	WNW	2	b. c.	1005·4	1·2	0·8	mod. NW swell
528	55° 33′ S, 30° 15′ W	12 xii	2119	—	S	0–1	—	0	o. f.	1000·2	−1·0	−1·0	no swell
529	55° 11½′ S, 31° 39′ W	13 xii	1020	—	NNW	8	NNW	1	o. f. e.	1003·6	−1·0	−1·0	mod. W swell
530	55° 32½′ S, 33° 14′ W	13 xii	2135	—	N	26	N	4	o. f.	991·9	−1·1	−1·2	mod. W swell
531	57° 27′ S, 34° 25′ W	14 xii	2125	—	N	23	—	0	o. p. q. r. s.	969·4	0·5	0·5	in lee of pack-ice
532	58° 29′ S, 37° 44′ W	15 xii	2140	3140*	S × E	17	S × E	2	o. f.	982·4	−1·4	−2·0	heavy conf. swell
533	59° 36′ S, 42° 34′ W	16 xii	2140	4133*	—	0	—	0	o. p. s.	988·6	−2·5	−3·0	slight S swell
534	60° 08′ S, 47° 53′ W	17 xii	2136	2623*	SSW	13	SSW	2	c.	996·6	−1·8	−2·6	mod. SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
524	9	0	0·00	33·88	27·22	8·13	75	8·41	N 50 V	100–0	1145		
		10	−0·09	33·87	27·22	8·13	75	—	N 70 V	50–0			
		20	−0·10	33·87	27·22	8·13	75	8·57	,,	100–50			
		30	−0·10	33·87	27·22	8·13	75	—	,,	150–100	—	1210	
		40	−0·10	33·87	27·22	8·13	75	8·39	N 70 B	117–0	1225	1245	KT
		50	−0·20	33·87	27·23	8·11	81	—	N 100 B				
		60	−0·40	33·90	27·26	8·06	88	8·01					
		80	−0·70	33·95	27·31	8·01	104						
		100	−0·80	33·98	27·34	7·97	112	7·41					
		150	−0·09	34·07	27·38	7·91	132	6·39					
525	9	0	0·39	33·83	27·16	8·20	68	—	N 50 V	100–0	1450		
		10	0·32	33·82	27·16	8·20	68	—	N 70 V	50–0			
		20	0·15	33·82	27·17	8·20	70	—	,,	100–50	—	1518	
		30	0·13	33·83	27·18	8·17	70	—	N 70 B	110–0	1533	1553	KT
		40	0·13	33·83	27·18	8·17	71	—	N 100 B				
		50	0·12	33·83	27·18	8·17	70						
		60	0·02	33·86	27·19	8·12	77						
		80	−0·60	33·90	27·27	7·99	104						
		100	−0·59	33·96	27·31	7·97	112						
		150	−0·42	34·01	27·35	7·95							
526	20	0	2·22	33·67	26·91	—	—	—	N 50 V	100–0	1727	1737	
527	22	0	0·35	33·87	27·20	—	—	—	N 450 H	122 (–0)	2225	2255	KT
528	22	0	−1·46	33·79	27·21	—	95	—	N 70 B	173–0	2125	2145	KT
		10	−1·47	33·79	27·21	—	96	—	N 100 B				
		20	−1·48	33·79	27·21	—	96	—	N 50 V	100–0	2150	2200	
		30	−1·49	33·79	27·21	—	96						
		40	−1·59	33·84	27·25	—	96						
		50	−1·64	33·92	27·32	—	96						
		60	−1·66	33·96	27·35	—	97						
		80	−1·60	34·08	27·45	—	103						
		100	−1·29	34·14	27·49	—	114						
		150	0·11	34·45	27·68	—	121						
		200	0·69	34·57	27·74	—	123						
529	23	0	−0·65	33·69	27·10	—	—	—	TYFV	500–0	1117		
									,,	1000–500	—	1227	
									N 50 V	100–0	1135	1145	
530	24	0	−0·95	33·80	27·20	—	—	—	N 70 B	168–0	2152	2212	KT
									N 100 B				
									N 100 B	450–168	2152	2223	DGP
531	24	0	−0·90	33·69	27·11	—	—	—	N 70 B	164–0	2137	2157	KT
									N 100 B				
									N 50 V	100–0	2208	2215	
532	25	0	−1·20	33·71	27·14	—	—	—	N 50 V	100–0	2139	2150	
									N 70 B	150–0	2202	2222	KT
									N 100 B				
533	26	0	0·15	33·98	27·30	—	—	—	N 70 B	165–0	2150	2210	KT. +3 hours G.M.T.
									N 100 B				
									N 50 V	100–0	2215	2220	
534	27	0	0·15	34·09	27·38	—	—	—	N 50 V	100–0	2138	2147	
									N 70 B	172–0	2155	2215	KT
									N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
535	60° 13¼′ S, 50° 51½′ W	1930 18 xii	1035	—	—	0–1	—	0	b. v.	998·3	−0·5	−1·0	alongside tabular berg; slight NW swell
536	60° 43′ S, 52° 29½′ W	18 xii	2130	1633*	ENE	6	—	0	c.	1001·0	−1·0	−1·5	slight NW swell
537	61° 07½′ S, 54° 26′ W	19 xii	0437	1086*	ENE	20	ENE	2	o.	999·9	−2·1	−1·8	heavy conf. swell
538	61° 29′ S, 54° 44¼′ W	19 xii	1004	1487*	E	19	E	4	o.	987·6	−0·7	−1·8	mod. E swell
539	61° 48′ S, 54° 51½′ W	19 xii	1440	1352*	ESE	22	ESE	3	o.	1004·2	−1·4	−2·0	slight ESE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
535	28	0	0·65	34·33	27·55	—	—	—	**NH**	0	1030	1115	
									N 70 B / **N 100 B**	155–0	1037	1057	KT
536	28	0	−0·30	34·42	27·67	—	—	—	**N 50 V**	100–0	2134	2140	
									N 70 B / **N 100 B**	122–0	2149	**2209**	KT
537	28	0	0·01	34·32	27·58	7·96	139	—	**N 50 V**	100–0	0440		
		10	−0·02	34·32	27·58	7·96	136	—	**N 70 V**	50–0			
		20	−0·04	34·32	27·58	7·96	133	—	,,	100–50			
		30	−0·04	34·32	27·58	7·96	131	—	,,	250–100			
		40	−0·07	34·33	27·59	7·96	131	—	,,	500–250			
		50	−0·08	34·33	27·59	7·96	131	—	,,	750–500			
		60	−0·11	34·34	27·60	7·96	131	—	,,	1000–750	—	0634	
		80	−0·22	34·34	27·61	7·95	129	—	**N 70 B** / **N 100 B**	137–0	0645	0705	KT
		100	−0·38	34·36	27·63	7·95	130	—					
		150	−0·51	34·42	27·68	7·95	136						
		200	−0·52	34·43	27·69	7·95	140						
		300	−0·72	34·44	27·71	7·93	126						
		400	−0·82	34·50	27·76	7·94	127						
		600	−0·73	34·51	27·77	7·99	139						
		800	−0·76	34·52	27·77	8·01	140						
		1000	−0·73	34·52	27·77	8·00	140						
538	29	0	−0·25	34·24	27·53	8·00	114	7·67	**N 50 V**	100–0	1003		
		10	−0·25	34·24	27·53	8·00	114	—	**N 70 V**	50–0			
		20	−0·32	34·24	27·53	8·00	117	7·60	,,	100–50			
		30	−0·46	34·24	27·54	7·99	125	—	,,	250–100			
		40	−0·48	34·25	27·55	7·98	123	7·50	,,	500–250			
		50	−0·50	34·25	27·55	7·97	128	—	,,	750–500			
		60	−0·60	34·29	27·58	7·96	129	7·37	,,	1000–750	—	1203	
		80	−0·43	34·30	27·58	7·96	127	—	**N 70 B** / **N 100 B**	137–0	1214	1234	KT
		100	−0·51	34·30	27·59	7·96	127	7·22					
		150	−0·89	34·32	27·62	7·94	127						
		200	−0·83	34·42	27·70	7·92	132	6·22					
		300	−0·83	34·49	27·75	7·88	136						
		400	−0·79	34·56	27·81	7·92	136	5·80					
		600	−1·04	34·58	27·83	7·96	136	5·92					
		800	−1·12	34·60	27·85	7·97	136	5·94					
		1000	−1·26	34·60	27·86	7·98	136	5·98					
		1250	−1·33	—	—	7·97	137	6·04					
539	29	0	−0·30	34·32	27·59	7·96	124	—	**N 50 V**	100–0	1445		
		10	−0·32	34·32	27·59	7·96	124	—	**N 70 V**	50–0			
		20	−0·32	34·32	27·59	7·96	121	—	,,	100–50			
		30	−0·40	34·33	27·60	7·96	121	—	,,	250–100			
		40	−0·45	34·33	27·61	7·96	118	—	,,	500–250			
		50	−0·50	34·33	27·61	7·96	118	—	,,	750–500			
		60	−0·57	34·34	27·62	7·96	121	—	,,	1000–750	—	1652	
		80	−0·60	34·36	27·64	7·96	121	—	**N 70 B** / **N 100 B**	137–0	1700	1720	KT
		100	−0·68	34·38	27·66	7·96	121	—					
		150	−0·71	34·38	27·66	7·95	122						
		200	−0·77	34·52	27·77	7·91	129						
		300	−0·92	34·53	27·79	7·88	132						
		400	−1·10	34·57	27·83	7·90	133						
		600	−1·22	34·61	27·87	7·94	136						
		800	−1·25	34·61	27·87	7·97	136						
		1000	−1·31	34·61	27·87	7·97	136						
		1250	−1·32	34·61	27·87	8·00	136						

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
540	62° 06¼′ S, 55° 08½′ W	1930 19 xii	1920	510*	SE × E	12	SE × E	2	o.	1007·4	−1·6	−2·8	mod. conf. E swell
541	62° 22′ S, 55° 23′ W	19–20 xii	2300	298*	SE	12	SE	0	o.	1009·9	−2·0	−2·4	slight conf. swell in lee of ice
542	62° 08′ S, 57° 28½′ W	20 xii	0700	1571*	SE	11	SE	2	o.	1013·3	−1·3	−2·5	mod. NE swell
543	62° 16′ S, 57° 20′ W	20 xii	1029	1810*	ESE	16	ESE	3	o.	1013·9	−1·0	−2·2	mod. conf. E swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
540	29	0	−0·48	34·36	27·63	8·00	120	7·17	**N 50 V**	100–0	1926		
		10	−0·51	34·36	27·63	8·00	120	—	**N 70 V**	50–0			
		20	−0·60	34·40	27·67	7·99	120	7·04	,,	100–50			
		30	−0·81	34·43	27·70	7·98	119	—	,,	250–100			
		40	−0·84	34·43	27·70	7·97	124	6·72	,,	500–250	—	2010	
		50	−0·86	34·47	27·74	7·94	129	—	**N 70 B**	155–0	2041	2101	KT
		60	−0·77	34·52	27·77	7·93	131	5·90	**N 100 B**				
		80	−0·78	34·52	27·77	7·93	126						
		100	−0·79	34·55	27·80	7·92	126	5·82					
		150	−0·80	34·57	27·82	7·92	126						
		200	−0·85	34·57	27·82	7·92	133	5·73					
		300	−1·00	34·58	27·83	7·92	119						
		400	−0·80	34·61	27·85	7·92	114	5·65					
		500	−0·67	34·62	27·85	7·91	123	5·53					
541	29	0	−0·85	34·53	27·79	8·00	111	—	**N 50 V**	100–0	2248		
		10	−0·85	34·54	27·79	8·00	111	—	**N 70 V**	50–0			
		20	−0·86	34·54	27·79	7·99	111	—	,,	100–50			
		30	−0·85	34·54	27·79	7·99	114	—	,,	250–100	—	2320	
		40	−0·87	34·54	27·79	7·98	115	—	**N 70 B**	108–0	**2352**	**0012**	KT
		50	−0·92	34·54	27·80	7·97	115	—	**N 100 B**				
		60	−0·99	34·54	27·80	7·97	120						
		80	−1·05	34·55	27·81	7·96	119						
		100	−1·06	34·56	27·82	7·95	119						
		150	−1·09	34·56	27·82	7·95	115						
		200	−1·09	34·56	27·82	7·94	120						
		250	−1·10	34·56	27·82	7·94	127						
542	0	0	−0·17	34·13	27·43	8·01	137	—	**N 50 V**	100–0	0700		
		10	−0·12	34·13	27·43	8·01	131	—	**N 70 V**	50–0			
		20	−0·20	34·18	27·48	8·01	131	—	,,	100–50			
		30	−0·20	34·19	27·48	8·00	133	—	,,	250–100			
		40	−0·20	34·19	27·48	8·00	133	—	,,	500–250			
		50	−0·20	34·19	27·48	8·00	132	—	,,	750–500			
		60	−0·22	34·19	27·48	7·98	135	—	,,	1000–750	—	0845	
		80	−0·44	34·22	27·52	7·97	135	—	**N 70 B**	155–0	0858	0918	KT
		100	−0·51	34·26	27·55	7·96	140	—	**N 100 B**				
		150	−0·48	34·38	27·65	7·95	141						
		200	−0·28	34·44	27·69	7·92	139						
		300	0·00	34·55	27·76	7·90	137						
		400	−0·69	34·58	27·82	7·93	142						
		600	−1·20	34·60	27·86	7·97	144						
		800	−1·40	34·60	27·86	7·98	145						
		1000	−1·45	34·60	27·86	8·01	147						
		1500	−1·69	34·66	27·92	8·04	141						
543	1	0	0·30	34·21	27·47	8·02	115	7·62	**N 50 V**	100–0	1034		
		10	0·24	34·21	27·48	8·02	118	—	**N 70 V**	50–0			
		20	0·19	34·21	27·48	8·02	118	7·65	,,	100–50			
		30	0·09	34·21	27·49	8·01	118	—	,,	250–100			
		40	−0·25	34·23	27·52	7·98	119	7·32	,,	500–250			
		50	−0·34	34·24	27·53	7·98	120	—	,,	750–500			
		60	−0·40	34·27	27·56	7·97	122	7·37	,,	1000–750	—	1155	
		80	−0·49	34·31	27·59	7·96	129	—	**N 70 B**	178–0	1205	1225	KT
		100	−0·81	34·37	27·65	7·94	129	6·87	**N 100 B**				
		150	−0·80	34·48	27·74	7·91	125						
		200	−0·99	34·53	27·79	7·90	129	6·09					
		300	−1·08	34·56	27·82	7·92	128						
		400	−1·17	34·57	27·83	7·95	128	6·03					
		600	−1·34	34·63	27·88	7·97	132	6·04					
		800	−1·58	34·63	27·89	7·98	132	6·26					
		1000	−1·65	34·64	27·90	8·00	132	6·33					
		1500	−1·72	34·65	27·91	8·06	132	6·43					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
544	62° 26¼′ S, 57° 15½′ W	1930 20 xii	1328	1094*	E × S	16	E × S	3	b. c.	1016·4	−2·0	−3·0	slight conf. swell
545	62° 37′ S, 57° 12¾′ W	20 xii	1628	607*	ESE	12	ESE	2	b. c. v.	1016·8	−1·3	−2·5	slight NE swell
546	62° 46¼′ S, 57° 11¼′ W	20 xii	1916	518*	ESE	5	ESE	1	b. v.	1018·4	−1·8	−3·2	slight NNE swell
547	62° 59¼′ S, 57° 03′ W	20 xii	2230	77*	WSW	3	—	0	b. v.	1018·6	−2·0	−2·8	
548	62° 36¾′ S, 58° 58′ W	21 xii	0830	1489*	E × N	3	E × N	0–1	b. c. v.	1017·3	0·5	−1·9	v. slight NE swell
549	63° 00¾′ S, 61° 16½′ W	21–22 xii	2340	304*	SW	5	—	0	o.	1017·8	−0·4	−1·0	v. slight SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
544	1	0	−0·08	34·28	27·55	8·00	106		**N 50 V**	100–0	1333		
		10	−0·11	34·28	27·55	8·00	103	—	**N 70 V**	50–0			
		20	−0·22	34·28	27·56	8·00	104	—	,,	100–50			
		30	0·33	34·28	27·56	7·99	108		,,	250–100			
		40	0·38	34·28	27·56	7·99	108	—	,,	500–250			
		50	0·40	34·28	27·57	7·99	109	—	,,	750–500			
		60	−0·51	34·28	27·57	7·98	111	—	,,	1000–750	—	1454	
		80	−0·60	34·29	27·58	7·97	114	—	**N 70 B**	180–0	1505	1525	KT
		100	0·72	34·30	27·59	7·96	115	—	**N 100 B**				
		150	−1·10	34·40	27·69	7·94	119						
		200	−0·92	34·50	27·76	7·92	129						
		300	−0·92	34·58	27·83	7·91	129						
		400	−1·12	34·60	27·85	7·93	129						
		600	1·52	34·60	27·87	7·97	129						
		800	−1·61	34·61	27·88	7·99	132						
		1000	−1·63	34·64	27·90	7·98	132						
545	1	0	−0·03	34·26	27·53	8·02	121	7·74	**N 50 V**	100–0	1630		
		10	−0·08	34·26	27·53	8·02	116	—	**N 70 V**	50–0			
		20	−0·18	34·28	27·55	8·01	115	7·73	,,	100–50			
		30	−0·22	34·30	27·57	8·00	117	—	,,	250–100			
		40	−0·40	34·31	27·59	7·99	117	7·47	,,	550–250	—	1713	
		50	−0·53	34·31	27·60	7·98	117	—	**N 70 B**	132–0	1753	1813	KT
		60	−0·60	34·32	27·61	7·97	118	7·32	**N 100 B**				
		80	−0·91	34·35	27·64	7·95	120						
		100	−1·03	34·45	27·73	7·92	124	6·44					
		150	−0·75	34·48	27·74	7·92	128						
		200	−0·92	34·54	27·80	7·92	122	5·99					
		300	−1·13	34·56	27·82	7·94	122						
		400	−1·12	34·58	27·84	7·95	127	5·93					
		500	1·04	34·59	27·84	7·96	127	5·92					
546	1	0	−0·60	34·51	27·76	7·97	110	—	**N 50 V**	100–0	1919		
		10	−0·78	34·51	27·77	7·97	114	—	**N 70 V**	50–0			
		20	−0·79	34·51	27·77	7·97	119	—	,,	100–50			
		30	−0·80	34·51	27·77	7·96	119	—	,,	250–100			
		40	−0·82	34·51	27·77	7·96	119	—	,,	500–250	—	2000	
		50	−0·85	34·51	27·77	7·96	120	—	**N 70 B**	164–0	2035	2055	KT
		60	−0·93	34·51	27·77	7·96	120	—	**N 100 B**				
		80	−0·99	34·51	27·78	7·96	120						
		100	−1·01	34·51	27·78	7·96	120						
		150	1·06	34·51	27·78	7·96	119						
		200	−1·11	34·52	27·79	7·95	119						
		300	1·20	34·53	27·80	7·95	122						
		400	−1·21	34·54	27·81	7·95	123						
		500	1·08	34·59	27·84	7·95	127						
547	1	0	1·02	34·53	27·79	7·97	119	6·89	**N 50 V**	80–0	2230		
		10	1·00	34·53	27·79	7·96	119	—	**N 70 V**	75–0	—	2245	
		20	1·00	34·53	27·79	7·96	119	6·92	**N 70 B**	37–0	2316	2336	KT
		30	−1·00	34·53	27·79	7·96	122	—	**N 100 B**				
		40	−1·00	34·53	27·79	7·96	123	6·91					
		50	1·00	34·54	27·80	7·96	122						
		60	1·00	34·55	27·81	7·96	119	6·93					
		70	−1·00	34·55	27·81	7·96	119						
548	1	0	0·45	34·18	27·44	—	—	—	**N 70 B**	102–0	0835	0855	KT
									N 100 B				
549	2	0	0·41	34·09	27·37	8·02	106	7·44	**N 50 V**	100–0	2344		
		10	0·12	34·09	27·39	8·01	108	—	**N 70 V**	50–0			
		20	0·10	34·12	27·41	8·01	108	7·54	,,	100–50			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
549 *cont.*	63° 00¾′ S, 61° 16½′ W	1930 21–22 xii											
550	63° 08¾′ S, 61° 05¾′ W	22 xii	0207	1266*	WSW	5	WSW	1	b. c.	1017·0	− 0·8	− 1·2	slight N swell
551	63° 17½′ S, 60° 55¾′ W	22 xii	0457	454*	WSW	12	WSW	3	b. v.	1016·3	− 0·4	− 1·8	slight SW swell
552	63° 26¼′ S, 60° 45′ W	22 xii	0733	302*	W S	15	W S	3	b. c.	1015·8	0·2	− 0·8	slight W swell
553	63° 33¾′ S, 60° 33½′ W	22 xii	0949	847*	W	15	W	3	o.	1015·0	− 0·3	− 0·8	slight W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
549 *cont.*	2	30	−0·19	34·14	27·44	7·99	109	—	**N 70 V**	290–100	—	0015	
		40	−0·42	34·15	27·46	7·97	112	7·10	**N 70 B**	115–0	0047	0107	KT
		50	−0·52	34·22	27·52	7·97	120	—	**N 100 B**				
		60	−0·60	34·24	27·54	7·96	120	6·81					
		80	−0·63	34·30	27·59	7·95	123						
		100	−0·66	34·32	27·61	7·92	120	6·36					
		150	−0·50	34·36	27·63	7·92	117						
		200	−0·46	34·41	27·67	7·91	118	5·81					
		300	0·04	34·50	27·72	7·92	123	5·28					
550	2	0	0·79	34·04	27·31	8·03	100	—	**N 50 V**	100–0	0211		
		10	0·25	34·03	27·33	8·02	103	—	**N 70 V**	50–0			
		20	−0·12	34·04	27·36	8·01	106	—	,,	100–50			
		30	−0·22	34·05	27·37	7·98	111	—	,,	250–100			
		40	−0·13	34·09	27·40	7·98	114	—	,,	500–250			
		50	−0·17	34·10	27·41	7·97	115	—	,,	750–500			
		60	0·18	34·14	27·44	7·97	115	—	,,	1000–750	—	0324	
		80	−0·20	34·17	27·47	7·97	118	—	**N 70 B**	150–0	0337	0357	KT
		100	−0·22	34·21	27·50	7·97	117	—	**N 100 B**				
		150	−0·68	34·30	27·59	7·95	118						
		200	−0·28	34·39	27·65	7·91	123						
		300	0·08	34·50	27·72	7·88	118						
		400	0·50	34·63	27·80	7·88	123						
		600	0·29	34·64	27·82	7·95	128						
		800	−0·18	34·64	27·85	7·97	128						
		1000	−0·81	34·63	27·87	7·99	136						
551	2	0	0·91	34·12	27·37	8·02	100	7·48	**N 50 V**	100–0	0500		
		10	0·87	34·12	27·37	8·02	100	—	**N 70 V**	50–0			
		20	0·68	34·12	27·38	8·01	100	7·49	,,	100–50			
		30	0·32	34·14	27·42	7·99	103	—	,,	250–100			
		40	0·13	34·23	27·50	7·97	109	6·72	,,	430–250	—	0540	
		50	−0·07	34·26	27·53	7·95	116	—	**N 70 B**	151–0	0612	0632	KT
		60	−0·09	34·29	27·56	7·95	119	6·36	**N 100 B**				
		80	−0·25	34·34	27·61	7·91	121						
		100	0·13	34·41	27·66	7·88	124	5·65					
		150	−0·35	34·45	27·70	7·88	122						
		200	−0·12	34·51	27·74	7·87	119	5·38					
		300	−0·80	34·51	27·77	7·89	128						
		400	−0·95	34·56	27·82	7·90	127	6·09					
552	2	0	0·72	34·14	27·39	8·02	108	—	**N 50 V**	100–0	0736		
		10	0·72	34·14	27·39	8·02	108	—	**N 70 V**	50–0			
		20	0·72	34·14	27·39	8·02	106	—	,,	100–50			
		30	0·21	34·23	27·49	7·98	109	—	,,	250–100	—	0801	
		40	0·08	34·23	27·50	7·96	116	—	**N 70 B**	130–0	0826	0846	KT
		50	0·06	34·30	27·56	7·96	116	—	**N 100 B**				
		60	−0·01	34·31	27·57	7·95	118						
		80	−0·20	34·39	27·64	7·92	119						
		100	−0·31	34·44	27·69	7·90	119						
		150	−0·45	34·49	27·74	7·89	120						
		200	−0·40	34·57	27·80	7·88	123						
		275	−0·42	34·58	27·81	7·88	128						
553	2	0	0·85	34·18	27·42	8·02	110	7·56	**N 50 V**	100–0	0942		
		10	0·89	34·18	27·42	8·02	109	—	**N 70 V**	50–0			
		20	0·85	34·18	27·42	8·01	109	7·57	,,	100–50			
		30	0·57	34·18	27·44	8·01	109	—	,,	250–100			
		40	0·21	34·18	27·45	7·98	109	6·99	,,	500–250			
		50	0·03	34·25	27·52	7·96	111	—	,,	750–500	—	1051	
		60	−0·09	34·31	27·57	7·96	114	6·75	**N 70 B**	116–0	1101	1121	KT
		80	−0·10	34·32	27·58	7·96	114	—	**N 100 B**				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
553 *cont.*	63° 33¾′ S, 60° 33½′ W	1930 22 xii											
554	62° 55′ S, 62° 13′ W	22 xii	2243	860*	WSW	16	WSW	3	b. c.	1013·2	−0·4	−0·4	slight SW swell
555	63° 17¾′ S, 61° 19¾′ W	28 xii	1000	1042*	W	3	W	1	o.	980·0	0·8	0·5	mod. W swell
556	64° 16½′ S, 63° 58½′ W	28 xii	2200	494*	SW × W	11	SW × W	2	c.	979·9	1·1	0·0	mod. WSW swell
557	64° 26¾′ S, 65° 40′ W	29 xii	1030	538*	SW	20	SW	3	b. c.	987·2	−0·5	−1·6	heavy W swell
558	65° 31′ S, 67° 07¾′ W	29 xii	2120	216 c. S. gn. M.	SSE	10	SSE	1	b. c.	990·8	−1·5	−2·0	mod. conf. swell close to pack-ice
559	66° 21¾′ S, 68° 55½′ W	30 xii	1002	479*	SW × S	12	SW × S	2	o.	988·8	−1·8	−2·8	mod. WSW swell
560	66° 47¼′ S, 69° 19′ W	30 xii	1400	335 c. S. gn. M.	WSW	8	—	0	c.	998·2	−2·6	−3·5	mod. W swell close to pack-ice
561	66° 47¼′ S, 72° 09¼′ W	31 xii	0948	666*	SSW	10	SSW	2	c.	993·3	−3·2	−3·7	mod. W swell near pack-ice

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
553 *cont.*		100	−0·40	34·42	27·68	7·92	119	6·37					
		150	−0·41	34·48	27·73	7·89	122						
		200	−0·68	34·49	27·75	7·87	120	6·12					
		300	−0·59	34·55	27·79	7·92	127						
		400	−0·70	34·58	27·82	7·93	127	5·76					
		600	−0·90	34·59	27·84	7·97	126	5·91					
		800	−0·97	34·59	27·84	7·97	125	5·87					
554	3	0	0·95	34·11	27·35	—	—	—	N 70 B	124–0	2250	2310	KT
									N 100 B				
555	8	0	0·88	34·02	27·29	—	—	—	N 70 B	146–0	1010	1030	KT
									N 100 B				
									N 50 V	100–0	1034	1042	
556	9	0	1·42	33·84	27·11	—	—	—	N 50 V	100–0	2200	2215	
									N 70 B	180–0	2226	2246	KT
									N 100 B				
557	9	0	1·31	32·54	26·19	8·07	103	—	N 50 V	100–0	1030	1050	
		5	−1·30	32·56	26·21	8·07	103	—	N 70 B	110–0	1114	1134	KT
		10	−0·98	32·74	26·34	8·05	104	—	N 100 B				
		15	0·23	33·54	26·94	8·05	104						
		20	−0·57	33·76	27·15	8·05	103						
		25	−0·62	33·82	27·20	8·01	106						
		30	−1·09	33·86	27·25	7·99	111						
		40	−1·30	33·89	27·28	7·97	112						
		50	−1·40	33·91	27·30	7·97	115						
558	10	0	−0·92	32·86	26·44	8·06	102	8·04	N 50 V	100–0	2123		
		10	−1·00	32·86	26·44	8·05	102	—	N 70 V	50–0			
		20	−1·30	33·35	26·84	8·02	102	7·71	,,	100–50			
		30	−1·50	33·76	27·18	7·98	109	—	,,	200–100	—	2150	
		40	1·52	33·86	27·27	7·98	114	7·14	N 70 B	146–0	2225	2245	KT
		50	−1·56	33·92	27·31	7·97	109	—	N 100 B				
		60	−1·53	33·96	27·35	7·95	112	6·78					
		80	−1·49	34·00	27·38	7·95	121						
		100	−1·28	34·16	27·50	7·92	129	6·26					
		150	−0·55	34·31	27·59	7·88	140						
		200	−0·31	34·36	27·62	7·87	140	5·36					
559	10	—	—	—	—	—	—	—	N 50 V	100–0	1005	1015	
									N 70 B	113–0	1025	1045	KT
									N 100 B				
560	10	0	−0·69	32·94	26·49	8·06	93	7·85	N 50 V	100–0	1403		
		10	−0·82	32·96	26·52	8·06	97	—	N 70 V	50–0			
		20	−1·49	33·85	27·26	8·04	114	7·10	,,	100–50			
		30	−1·70	33·90	27·30	8·00	115	—	,,	250–100	—	1430	
		40	−1·70	33·91	27·31	7·99	115	6·93	N 70 B	155–0	1508	1528	KT
		50	−1·75	33·93	27·33	7·98	122	—	N 100 B				
		60	−1·72	34·00	27·38	7·96	116	6·82					
		80	−1·69	34·07	27·44	7·96	128						
		100	−1·47	34·17	27·52	7·94	118	6·42					
		150	−0·60	34·36	27·64	7·90	110						
		200	0·16	34·51	27·72	7·90	122	4·93					
		300	0·92	34·65	27·79	7·87	125	4·46					
561	11	0	−1·35	33·57	27·03	—	—	—	N 50 V	100–0	0950	0957	
									N 70 B	137–0	1007	1027	KT
									N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. °C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
562	67° 15½′ S, 75° 27′ W	1930 31 xii	2228	3361*	SE	6	SE	1	o. p. s.	986·4	−2·8	−2·8	mod. W swell; open lead in loose pack
563	66° 58½′ S, 79° 32¼′ W	1931 1 i	1015	3875*	SW × S	25	SW × S	3	o.	987·3	−4·3	−4·8	mod. SW swell
564	67° 10½′ S, 80° 53′ W	1 i	2200	—	WSW	6	WSW	1	o.	987·3	−3·5	−4·3	slight SE × S swell near pack-ice
565	67° 20′ S, 82° 10′ W	2 i	1010	4303*	SE	19	SE	3	c.	1002·2	−2·3	−2·3	mod. conf. SW swell
566	66° 23′ S, 85° 28½′ W	2 i	2200	4495*	—	0–2	—	0	b. c.	1003·9	−0·7	−2·0	mod. conf. SSW swell
567	66° 45′ S, 89° 24′ W	3	1012	4428*	NW × N	20	NW × N	4	o.	998·5	−0·1	−0·2	mod. W swell
568	67° 48½′ S, 92° 42¼′ W	3 i	2203	4556*	W	18	W	3	o.	993·5	−0·8	−1·4	mod. W swell
569	68° 40½′ S, 96° 21′ W	4 i	1042	4449*	—	0–1	—	0	o.	990·4	2·1	1·3	slight SW swell near pack-ice
570	69° 07½′ S, 99° 49¾′ W	4 i	2150	4451*	E × N	6	E × N	1	o.	999·7	−2·4	−3·4	near pack-ice
571	69° 12¼′ S, 100° 39¼′ W	5 i	0915	4422*	E × S	6	—	0	o.	991·7	−2·6	−3·9	open lead in pack-ice
572	69° 16′ S, 101° 07¾′ W	6 i	2024	4181*	SE × E	22	SE × E	2	o.	981·3	−2·0	−3·2	slight conf. swell; open lead in pack-ice
573	68° 05¾′ S, 98° 13½′ W	7 i	1012	4598*	SE × S	20	SE × S	4	o.	974·2	−2·8	−3·5	mod. SE swell
574	67° 43′ S, 94° 18¼′ W	7 i	2210	4449*	SW × W	20	SW × W	4	o.	972·8	−1·7	−2·7	mod. conf. swell near pack-ice
575	67° 53¼′ S, 91° 23′ W	8 i	1002	4142*	W × S	14	W × S	2	o. p. s.	976·2	−1·4	−2·0	mod. NW swell near loose pack-ice
576	67° 50′ S, 89° 12¾′ W	8 i	2133	4069*	NW × N	8	—	1	o.	983·4	−1·2	−2·0	slight SE × S swell; in open lead in pack-ice, near large berg
577	68° 06½′ S, 85° 10′ W	9 i	1000	3926*	W	13	W	2	b.	990·7	0·8	−0·4	slight W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	TIME To	Remarks
562	12	0	−0·62	33·26	26·75	—	—	—	N 50 V	100–0	2226	2234	
									N 70 B / N 100 B	113–0	2245	2305	KT
563	12	0	−0·52	33·57	27·00	—	—	—	N 70 B / N 100 B	180–0	1115	1140	
									N 100 B	450–180	1115	1150	DGP
564	13	0	−0·82	33·29	26·78	—	—	—	N 50 V	100–0	2202	2209	
									N 70 B / N 100 B	124–0	2216	2236	KT
565	13	0	0·20	33·91	27·24	—	—	—	N 50 V	100–0	1010	1017	
									N 70 B / N 100 B	119–0	1026	1046	KT
566	14	0	0·95	33·80	27·11	—	—	—	N 50 V	100–0	2201	2210	
									N 70 B / N 100 B	182–0	2218	2238	KT
567	14	0	0·40	33·91	27·23	—	—	—	N 50 V	100–0	1018	1025	
									N 70 B / N 100 B	140–0	1033	1053	KT
568	15	0	0·25	33·68	27·05	—	—	—	N 50 V	100–0	2206	2213	
									N 70 B / N 100 B	177–0	2225	2245	KT
569	15	0	−1·50	32·94	26·52	—	—	—	N 50 V	100–0	1038	1045	
									N 70 B / N 100 B	137–0	1100	1120	KT
570	16	0	−0·68	33·10	26·62	—	—	—	N 50 V	100–0	2152	2159	
									N 70 B / N 100 B	132–0	2210	2230	KT
571	16	0	−1·20	32·95	26·52	—	—	—	N 50 V	100–0	0919	0927	
									N 70 B / N 100 B	182–0	0941	0959	KT
572	17	0	−1·10	32·94	26·51	—	—	—	N 50 V	100–0	2023	2030	
									N 70 B / N 100 B	96–0	2040	2100	KT
573	18	0	0·02	33·48	26·90	—	—	—	N 50 V	100–0	1010	1020	
									N 70 B / N 100 B	174–0	1030	1050	KT
574	19	0	−0·68	33·71	27·12	—	—	—	N 50 V	100–0	2208	2216	
									N 70 B / N 100 B	120–0	2224	2244	KT
575	19	0	−1·47	33·37	26·87	—	—	—	N 50 V	100–0	1000	1011	
									N 70 B / N 100 B	97–0	1021	1041	KT
576	20	0	−1·15	33·35	26·84	—	—	—	N 50 V	100–0	2130	2139	
									N 70 B / N 100 B	132–0	2155	2215	KT
577	20	0	−0·20	33·30	26·76	—	—	—	N 50 V	100–0	1004	1010	
									N 70 B / N 100 B	114–0	1019	1039	KT

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
578	67° 54′ S, 81° 26¾′ W	1931 9 i	2157	3883*	W × S	6	W × S	1	b. c.	998·0	0·2	−1·5	mod. NNW swell near pack-ice
579	66° 41¾′ S, 79° 10′ W	10 i	1000	4056*	—	0	—	0	b. c.	1000·3	0·0	0·3	mod. WNW swell
580	67° 41½′ S, 75° 56½′ W	10 i	2205	3215*	S × E	13	S × E	2	b.	998·7	−1·0	−1·7	mod. NNW swell
581	67° 46′ S, 74° 50′ W	11 i	2018	2677*	S	6	—	0	o.	983·4	−1·5	−2·2	slight NNW swell in lead in pack-ice
582	66° 58¼′ S, 72° 24′ W	12 i	1010	404*	S	11	S	2	o. m.	998·3	−4·0	−4·0	slight NW swell
583	67° 18¼′ S, 69° 53′ W	12 i	2158	530*	S × W	12	S × W	3	b.	998·3	−1·0	−1·2	slight S swell
584	67° 26¾′ S, 69° 35¼′ W	13 i	0000	284*	SSW	4	SW	2	b. c.	998·1	−1·5	−1·7	slight conf. swell 3 miles from edge of pack-ice
585	67° 08½′ S, 70° 15½′ W	13 i	0345	585*	SSE	8	SSE	1	b. c.	998·5	−3·5	−4·5	no swell
586	66° 49′ S, 70° 50′ W	13 i	0801	497*	W	0–3	W	1	b.	999·6	−2·6	−3·0	slight conf. WNW swell near numerous ice-bergs

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	TIME To	Remarks
578	21	0	–1·20	33·21	26·73	—	—	—	**N 50 V**	100–0	2200	2207	
									N 70 B	128–0	2215	2235	KT
									N 100 B				
579	21	0	–0·25	33·12	26·62	—	—	—	**N 50 V**	100–0	1003	1010	
									N 70 B	180–0	1019	1039	KT
									N 100 B				
580	22	0	–0·10	33·24	26·71	—	—	—	**N 50 V**	100–0	2202	2210	
									N 70 B	128–0	2221	2241	KT
									N 100 B				
581	23	0	–1·32	33·08	26·63	—	—	—	**N 50 V**	100–0	2015	2025	
									N 70 B	109–0	2047	2107	KT
									N 100 B				
582	23	0	–0·15	33·37	26·82	—	—	—	**N 50 V**	100–0	1010	1018	
									N 70 B	128–0	1030	1050	KT
									N 100 B				
583	24	0	–0·19	33·10	26·60	—	—	—	**N 50 V**	100–0	2200	2207	
									N 70 B	139–0	2218	2238	KT
									N 100 B				
584	24	0	–0·72	33·17	26·68	8·16	78	8·18	**N 50 V**	100–0	0004		
		10	–0·75	33·17	26·68	8·13	82	—	**N 70 V**	50–0			
		20	–0·73	33·21	26·71	8·13	89	8·02	,,	100–50			
		30	–1·60	33·59	27·05	8·06	88	—	,,	250–100	—	0036	
		40	–1·74	33·98	27·37	7·99	111	6·74	**N 70 B**	165–0	0104	0124	KT
		50	–1·74	34·02	27·40	7·97	112	—	**N 100 B**				
		60	–1·75	34·02	27·40	7·98	114	6·56					
		80	–1·71	34·09	27·46	7·98	116						
		100	–1·55	34·13	27·49	7·97	117	6·32					
		150	–0·87	34·28	27·58	7·96	121						
		200	0·06	34·49	27·71	7·93	129	4·94					
		275	0·84	34·65	27·80	7·91	130	4·47					
585	24	0	0·70	33·21	26·71	8·13	83	8·04	**N 50 V**	100–0	0346		
		10	1·10	33·33	26·82	8·12	86	—	**N 70 V**	50–0			
		20	–1·44	33·44	26·93	8·09	91	7·72	,,	100–50			
		30	–1·68	33·81	27·23	8·03	105	—	,,	250–100			
		40	–1·70	33·94	27·33	7·99	106	6·62	,,	500–250	—	0425	
		50	1·72	34·00	27·38	7·98	110	—	**N 70 B**	160–0	0518	0538	KT
		60	–1·77	34·03	27·41	7·97	112	6·60	**N 100 B**				
		80	–1·77	34·05	27·43	7·97	119						
		100	–1·65	34·09	27·45	7·97	119	6·38					
		150	–1·20	34·24	27·46	7·95	120						
		200	–0·20	34·44	27·68	7·90	123	4·93					
		300	0·71	34·64	27·80	7·88	135						
		400	0·88	34·67	27·81	7·89	139	4·46					
		500	1·02	34·69	27·82	7·92	140	4·36					
586	24	0	1·30	32·99	26·55	8·07	93	8·12	**N 50 V**	100–0	0804		
		10	–1·52	33·14	26·67	8·08	97	—	**N 70 V**	50–0			
		20	–1·60	33·28	26·80	8·06	108	7·66	,,	100–50			
		30	–1·50	33·62	27·07	8·02	109	—	,,	250–100			
		40	–1·50	33·88	27·28	7·98	112	6·99	,,	470–250	—	1025	
		50	–1·61	33·97	27·36	7·97	113	—	**N 70 B**	154–0	0937	0958	KT
		60	–1·62	34·01	27·39	7·97	114	6·65	**N 100 B**				
		80	–1·62	34·03	27·41	7·96	121						
		100	–1·48	34·12	27·47	7·95	116	6·28					
		150	–0·60	34·33	27·61	7·89	127						

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
586 *cont.*	66° 49′ S, 70° 50′ W	1931 13 i											
587	66° 28½′ S, 71° 16¼′ W	13 i	1247	507*	SSW	7	SSW	1	c.	999·5	−0·7	−1·5	mod. conf. WNW and NNE swell
588	66° 11½′ S, 71° 50¼′ W	13 i	1718	3098*	—	0–1	—	0	o. p. s.	1000·1	−0·5	−1·0	slight WNW swell
589	65° 54′ S, 72° 24¼′ W	13–14 i	2240	3008*	NE	1–2	NE	1	o. s.	1000·0	−0·3	−0·5	slight conf. swell
590	65° 20½′ S, 73° 30½′ W	14 i	0701	3535*	ESE	6	—	1	o. m.	1000·0	0·2	−0·2	mod. conf. swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
586 *cont.*	24	200	−0·10	34·48	27·71	7·87	128	4·87					
		300	0·77	34·64	27·79	7·86	128						
		400	0·92	34·66	27·80	7·85	128	4·45					
587	24	0	0·12	33·72	26·28	8·07	85	8·10	**N 50 V**	100–0	1249		
		10	−0·08	32·76	26·32	8·06	85	—	**N 70 V**	50–0			
		20	−1·00	33·44	26·91	8·02	92	7·89	,,	100–50			
		30	−1·33	33·81	27·22	7·97	103	—	,,	250–100			
		40	−1·49	33·91	27·30	7·96	114	6·94	,,	500–250	—	1336	
		50	1·61	33·96	27·35	7·95	115	—	**N 100 B**	400–120	1422	1452	DGP
		60	1·69	34·01	27·39	7·94	118	6·65	**N 70 B**	119–0	1422	1442	KT
		80	−1·61	34·05	27·42	7·94	119	—	**N 100 B**				
		100	−1·49	34·11	27·47	7·91	135	6·21					
		150	−0·62	34·28	27·57	7·86	140						
		200	0·41	34·37	27·64	7·85	140	5·34					
		300	0·66	34·60	27·77	7·86	140						
		400	0·92	34·67	27·81	7·86	140	4·37					
		500	1·03	34·70	27·82	7·86	133	4·39					
588	25	0	1·21	33·71	27·02	8·00	93	7·63	**N 50 V**	100–0	1722		
		10	0·89	33·77	27·09	7·99	96	—	**N 70 V**	50–0			
		20	0·83	33·79	27·11	7·99	100	7·57	,,	100–50			
		30	0·10	33·86	27·20	8·00	112	—	,,	250–100			
		40	−1·12	34·01	27·38	7·97	121	7·29	,,	500–250			
		50	−1·54	34·06	27·43	7·95	130	—	,,	750–500			
		60	−1·51	34·10	27·46	7·95	131	6·67	,,	1000–750	—	1905	
		80	−1·32	34·17	27·51	7·91	129	—	**N 70 B**	150–0	1945	2005	KT
		100	−0·90	34·25	27·56	7·90	144	6·01	**N 100 B**				
		150	0·30	34·43	27·65	7·87	144	—	**N 100 B**	460–150	1945	2016	DGP
		200	1·43	34·58	27·70	7·85	144	4·31					
		300	1·62	34·67	27·76	7·85	142						
		400	1·65	34·70	27·78	7·87	140	4·19					
		600	1·53	34·72	27·80	7·88	137	4·26					
		800	1·42	34·72	27·81	7·93	135	4·34					
		1000	1·25	34·72	27·83	7·95	133						
		1500	0·88	34·72	27·85	7·96	133	4·54					
		2000	0·62	34·71	27·86	7·97	132						
		2500	0·42	34·70	27·86	7·98	132	4·51					
		3000	0·38	34·70	27·86	8·04	132	4·71					
589	25	0	1·20	33·48	26·83	8·04	100	7·60	**N 50 V**	100–0	2243		
		10	0·99	33·55	26·90	8·03	101	—	**N 70 V**	50–0			
		20	0·58	33·68	27·03	8·02	108	7·65	,,	100–50			
		30	−0·10	33·86	27·21	8·00	111	—	,,	250–100			
		40	1·11	33·95	27·33	7·98	125	7·16	,,	500–250			
		50	−1·49	34·01	27·39	7·96	127	—	,,	750–500			
		60	−1·61	34·05	27·42	7·96	129	6·74	,,	1000–750	—	0125	
		80	−1·57	34·13	27·49	7·95	131	—	**N 70 B**	130–0	0146	0206	KT
		100	−1·30	34·21	27·54	7·91	130	6·22	**N 100 B**				
		150	0·09	34·37	27·61	7·88	132	—	**N 100 B**	450–130	0146	0216	DGP
		200	0·55	34·49	27·68	7·86	135	4·92					
		300	1·40	34·64	27·75	7·85	137						
		400	1·52	34·70	27·79	7·87	137	4·22					
		600	1·43	34·71	27·80	7·90	139	4·30					
		800	1·37	34·72	27·82	7·93	139	4·21					
		1000	1·15	34·72	27·83	7·95	139						
		1500	0·85	34·72	27·85	7·98	135	4·46					
		2000	0·58	34·71	27·86	7·97	135						
		2500	0·39	34·70	27·86	8·06	137	4·65					
590	25	0	1·57	33·73	27·01	8·03	104	7·55	**N 50 V**	100–0	0709		
		10	1·19	33·78	27·08	8·03	106	—	**N 70 V**	50–0			

Depth	Nitrate + Nitrite N_2 mgm./m.³
0	490
10	490
30	490
80	490
150	490
300	540
1000	510
2000	510
3000	510

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
590 *cont.*	65° 20½′ S, 73° 30½′ W	1931 14 i	0958	—	SE	15	SE	3	o. p. d.	999·6	0·5	0·2	mod. conf. swell
			1500	—	SE	15	SE	3	o. g.	999·6	0·5	0·3	,,
591	64° 51½′ S, 74° 22½′ W	14 i	2003	3800*	SE	9	SE	2	o.	1000·4	1·4	1·1	mod. conf. swell
592	64° 17′ S, 75° 31′ W	15 i	0148	3914*	SE × E	12	SE × E	3	o.	998·9	2·0	1·5	mod. NW × N swell
593	64° 42′ S, 73° 33½′ W	15 i	1000	3762*	—	0–1	—	0	o.	997·9	1·6	1·3	mod. NE swell
594	64° 56¼′ S, 72° 11′ W	15 i	1543	3681*	NE	6	NE	1–2	o.	997·7	2·0	1·6	mod. NE swell
595	65° 14¾′ S, 70° 26½′ W	16 i	0000	2900*	N	9	N	2	o.	996·1	1·0	1·0	mod. NE swell
596	65° 31′ S, 68° 55½′ W	16 i	0536	369*	NE	18	NE	3	o. s.	994·2	0·8	0·8	mod. NE swell
597	65° 51¼′ S, 69° 58½′ W	16 i	1153	355*	SW × W	13	SW × W	3	o.	992·5	0·1	− 0·4	mod. NNE swell
598	66° 59½′ S, 69° 41′ W	16 i	2200	604*	WNW	6	WNW	1	o.	994·7	− 0·6	− 1·2	mod. conf. NNE swell
599	67° 08′ S, 69° 06½′ W	17 i	1400 1514	177* 203*	WNW	5	—	0	o.	995·0	0·0	− 0·9	mod. N swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. C.	S	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
590 *cont.*	25	20	0·92	33·80	27·11	8·03	106	7·59	**N 70 V**	100–50			
		30	0·88	33·81	27·12	8·02	106	—	,,	250–100			
		40	0·53	33·83	27·16	8·02	116	7·55	,,	500–250			
		50	−0·52	33·90	27·26	7·99	118	—	,,	750–500			
		60	−1·40	34·00	27·37	7·97	130	7·04	,,	1000–750	—	0925	
		80	−1·54	34·04	27·41	7·96	133	—	**N 70 B**	90–0	1014	1034	KT
		100	−1·40	34·11	27·46	7·95	135	6·49	**N 100 B**				
		150	0·00	34·34	27·59	7·88	148	—	**N 100 B**	310–0	1014	1051	DGP
		200	0·81	34·45	27·64	7·86	147	4·77	**TYFH**	1150–1400	1230	1420	DGB
		300	1·31	34·57	27·70	7·86	145						
		400	1·58	34·68	27·77	7·86	145	4·27					
		600	1·66	34·71	27·79	7·90	144	4·19					
		800	1·52	34·71	27·80	7·93	142	4·21					
		1000	1·39	34·71	27·81	7·95	142						
		1500	1·08	34·71	27·83	7·97	135	4·33					
		2000	0·81	34·70	27·84	7·97	136						
		2500	0·59	34·69	27·84	7·98	148	4·23					
		3000	0·42	34·69	27·85	8·04	154	4·64					
591	26	0	1·49	33·73	27·01	—	—	—	**N 50 V**	100–0	2008	2015	
									N 70 B	122–0	2037	2057	KT
									N 100 B				
									N 100 B	360–122	2037	2105	DGP
592	26	0	1·60	33·89	27·14	—	—	—	**N 50 V**	100–0	0155	0202	
									N 70 B	124–0	0220	0240	KT
									N 100 B				
									N 100 B	350–124	0220	0251	DGP
593	26	0	1·22	33·82	27·11	—	—	—	**N 50 V**	100–0	1005	1013	
									N 70 B	128–0	1031	1051	KT
									N 100 B				
									N 100 B	360–128	1031	1101	DGP
594	27	0	1·49	33·78	27·06	—	—	—	**N 70 B**	165–0	1602	1622	KT
									N 100 B				
									N 100 B	435–165	1602	1632	DGP
									N 50 V	100–0	1700	1710	
595	27	0	1·30	33·80	27·08	—	—	—	**N 50 V**	100–0	0003	0009	
									N 70 B	133–0	0025	0045	KT
									N 100 B				
									N 100 B	380–133	0025	0054	DGP
596	27	0	1·51	33·73	27·01	—	—	—	**N 50 V**	100–0	0536	0545	
									N 70 B	170–0	0559	0619	KT
									N 100 B				
597	28	0	1·85	33·74	27·00	—	—	—	**N 50 V**	100–0	1155	1202	
									N 70 B	155–0	1211	1231	KT
									N 100 B				
598	28	0	0·22	33·09	26·58	—	—	—	**N 50 V**	100–0	2203	2210	
									N 70 B	155–0	2217	2237	KT
									N 100 B				
599	28	0	−0·71	33·15	26·67	8·11	—	—	**N 50 V**	100–0	1402		
		10	−0·92	33·20	26·71	8·11	—	—	**N 70 V**	50–0			
		20	0·75	33·26	26·75	8·09	—	—	,,	100–50			
		30	−0·75	33·30	26·79	8·10	—	—	,,	150–100	—	1425	
		40	−0·90	33·37	26·85	8·08	—	—	**N 70 B**	142–0	1448	1508	KT
		50	−1·40	33·45	26·93	8·06	—	—	**N 100 B**				

Depth	Nitrate + Nitrite N_2 mgm./m.^{3}
0	290
20	290
40	270
60	350
80	370
100	350
150	390
175	390

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
599 *cont.*	67° 08′ S, 69° 06½′ W	1931 17 i											
600	67° 09′ S, 69° 27′ W	17 i	1705 1743 1840 1955	487* 512* 501* 527*	—	0	—	0	b. c.	995·7	2·1	0·7	mod. N swell
601	66° 41′ S, 66° 56′ W	18 i	0945	412*	WSW	15	WSW	2	c.	987·8	1·2	−0·6	
602	66° 03½′ S, 66° 25′ W	19 i	2205	474*	W × S	20	W × S	3	b. c.	995·9	−1·5	−2·7	mod. S × W swell near large tabular berg
603	65° 04½′ S, 67° 51½′ W	20 i	1000	525*	SW	23	SW	4	c.	1001·6	−0·7	−2·0	mod. SW swell
604	1 cable S of South Cape, Doumer I, Palmer Archipelago	25 i	1000	145*	—	0–1	—	0	b.	995·8	5·0	0·8	
605	1·4 miles N 18° E of Waif Is., Schollaert Channel, Palmer Archipelago	26 i	1140	357*	—	0–1	—	0	b. v.	1003·2	2·4	0·2	
606	64° 13½′ S, 61° 38′ W	26 i	1700	618*	S × W	2	S × W	1	b. v.	1002·7	4·0	0·2	
607	62° 56½′ S, 61° 16′ W	27 i	0856	238*	WSW	17	WSW	3	c.	998·0	0·6	−0·2	mod. conf. W swell
608	62° 52½′ S, 61° 32½′ W	7 ii	1001	86*	WSW	6	WSW	2	o.	1003·5	0·2	−0·3	slight WSW swell
609	62° 08¼′ S, 62° 57¼′ W	8 ii	0825	3162*	WNW	1	—	0	o. f.	1012·0	2·4	2·4	mod. WNW swell
610	62° 17¼′ S, 62° 28¼′ W	8 ii	1443	1673*	NNW	2	—	0	o. f.	1004·1	4·9	4·5	mod. NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
599 *cont.*	28	60	–1·48	33·76	27·18	7·98	—	—	**DLH**	203	1528	1529	
		80	–1·40	34·12	27·47	7·92							
		100	–1·39	34·21	27·54	7·91							
		150	–0·38	34·40	27·66	7·87							
		175	–0·01	34·47	27·70	7·87							
600	29	—	—	—	—	—	—	—	**DLH**	487–512	1720	1727	
									OTL				
									N 7–T	501–527	1840	1947	Net badly torn
									N 4–T				
601	29	0	–0·68	32·96	26·51	—	—	—	**N 50 V**	100–0	0945	1000	
									N 70 B	120–0	1015	1035	KT
									N 100 B				
602	1	0	–0·02	32·97	26·49	—	—	—	**N 50 V**	100–0	2202	2210	
									N 70 B	110–0	2220	2240	KT
									N 100 B				
603	2	0	1·08	33·19	26·61	—	—	—	**N 50 V**	100–0	1005	1014	
									N 70 B	140–0	1024	1044	KT
									N 100 B				
604	7	0	0·18	33·27	26·72	—	—	—	**N 50 V**	100–0	1003	1013	
									N 70 B	137–0	1020	1035	KT
									N 100 B				
605	8	0	1·50	33·86	27·12	—	—	—	**N 50 V**	100–0	1150	1157	
									N 70 B	137–0	1203	1223	KT
									N 100 B				
606	8	0	3·30	33·90	27·00	—	—	—	**N 50 V**	10–0	1700		
		5	1·84	33·89	27·12	—	—	—	,,	20–0			
		10	1·00	33·91	27·19	—	—	—	,,	100–0	—	1715	
		15	0·97	33·97	27·24								
		20	0·88	34·05	27·31								
607	9	0	0·97	34·17	27·40	—	—	—	**N 50 V**	100–0	0904	0912	
									N 70 B	137–0	0921	0941	KT
									N 100 B				
608	19	0	1·20	34·24	27·44	—	—	—	**N 50 V**	80–0	1011	1018	
									N 70 B	56–0	1022	1042	KT
									N 100 B				
609	20	0	2·03	33·80	27·03	—	—	—	**N 50 V**	100–0	0820	0829	
		10	1·99	33·84	27·07	—	—	—	**N 70 B**	128–0	0920	0940	KT
		20	1·72	33·84	27·09	—	—	—	**N 100 B**				
		30	1·65	33·87	27·12								
		40	0·28	33·88	27·21								
		50	–0·70	33·98	27·33								
		60	–1·00	34·05	27·40								
		80	–0·86	34·15	27·48								
		100	–0·74	34·23	27·54								
		150	0·45	34·41	27·62								
		200	1·19	34·57	27·71								
610	21	0	3·12	—	—	—	—	—	**TYFV**	500–250	1516	1520	
									,,	1000–750	1606	1610	
									,,	750–500	1648	1653	

Depth	Nitrate + Nitrite N_2 mgm./m.³
10	350
20	400
40	380
60	430
80	500
100	510
150	570
200	630

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
610 *cont.*	62° 17¼′ S, 62° 28¼′ W	1931 8 ii											
611	62° 49′ S, 58° 27¼′ W	10 ii	1730	1072*	N × W	18	N × W	3	c.	1012·5	2·6	2·2	slight N swell
612	62° 42′ S, 57° 10′ W	10 ii	2200	567*	N	11	N	3	o.	1011·6	2·5	1·8	mod. conf. swell
613	60° 59¾′ S, 50° 42½′ W	12 ii	1012	944*	W × S	18	W × S	5	b.	996·8	2·0	0·2	heavy W swell
614	60° 07¾′ S, 48° 20¼′ W	12 ii	2200	1713*	NW × W	19	NW × W	4	o.	999·9	2·1	2·0	heavy NW swell
615	60° 55½′ S, 47° 58¼′ W	13 ii	1000	2537*	NW × W	20	NW × W	6	b. c.	995·3	1·0	1·0	heavy WNW swell
616	Sandefjord Harbour, Coronation I, South Orkneys	14 ii	2000	—	N	2	N	1	o. m.	1010·6	– 0·8	– 0·8	slight SW swell
		15 ii											
		16 ii	1200	—	SW	6	SW	1	o. m.	997·6	– 0·8	– 0·9	slight S swell
		17 ii	1200	—	SE × S	18	SE × S	2	o.	996·7	– 3·1	– 3·5	slight SSE swell
617	60° 22′ S, 45° 40′ W	18 ii	0959	1821*	SE × E	15	SE × E	3	o. p. s.	998·4	– 2·3	– 2·6	slight SE × E swell
618	59° 42¾′ S, 43° 57¾′ W	18–19 ii	2229	3720*	SE	15	SE	3	o.	997·2	– 2·8	– 3·5	slight NNW swell
			0205	—	SE	12	SE	3	o.	996·1	– 3·3	– 3·8	slight WNW swell
619[1]	59° 33′ S, 43° 07¼′ W	19 ii	1000	4091*	SW	11	SW	2	o.	992·5	– 3·4	– 4·0	slight N swell
620	59° 12′ S, 40° 23½′ W	19–20 ii	2217	3268*	SW	20	SW	4	o. p. s. q.	983·4	– 3·0	– 3·5	mod. SW swell
			0130	—	SW	23	SW	4	o. p. s.	982·4	– 3·0	– 3·5	,,

[1] In Plate I this station is plotted 3° of longitude too far East.

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
610 *cont.*	21	0	3·12	—	—	—	—	—	TYFV	250–0	1719	1723	
									N 50 V	100–0	1642	1650	
611	23	0	1·45	34·30	27·47	—	—	—	N 70 B	121–0	1740	1800	KT
									N 100 B				
612	23	0	0·52	34·31	27·54	—	—	—	N 50 V	100–0	**2200**	**2210**	
									N 70 B	160–0	**2218**	**2238**	KT
									N 100 B				
613	25	0	−0·21	34·45	27·69	—	—	—	N 70 B	182–0	1026	1046	KT
									N 100 B				
									N 50 V	100–0	1050	1100	
614	25	0	0·72	34·30	27·52	—	—	—	N 50 V	100–0	**2204**	**2215**	
									N 70 B	153–0	**2223**	**2243**	KT
									N 100 B				
615	26	0	−0·68	32·73	26·32	—	—	—	N 50 V	100–0	1022	1029	
									N 70 B	132–0	1040	1100	KT. N 70 torn
									N 100 B				
616	27	—	—	—	—	—	—	—	N 70 H	0–1	**2130**	0830	14–15 ii
									TN	30	—	—	15–18 ii
	29	—	—	—	—	—	—	—	HH	0	0730	—	16 ii
	0	0	−1·05	33·97	27·34	—	—	—	N 70 H	0–1	**2230**	**0420**	17–18 ii
617	1	0	−0·92	33·44	26·91	—	—	—	N 50 V	100–0	1002	1010	
									N 70 B	137–0	1019	1039	KT
									N 100 B				
618	1	0	1·29	34·13	27·35	8·03	—	7·51	N 70 B	109–0	**2205**	**2225**	KT
		10	1·30	34·13	27·35	8·02	—	—	N 100 B				
		20	1·29	34·14	27·36	8·02	—	7·45	N 50 V	100–0	**2235**		
		30	1·20	34·15	27·37	8·02	—	—	N 70 V	50–0			
		40	1·04	34·16	27·39	8·01	—	7·35	,,	100–50			
		50	0·79	34·23	27·46	7·98	—	—	,,	250–100			
		60	0·50	34·25	27·49	7·96	—	6·86	,,	500–250			
		80	0·39	34·30	27·54	7·93	—	—	,,	750–500			
		100	0·31	34·36	27·59	7·91	—	6·35	,,	1000–750	—	**0110**	
		150	0·91	34·54	27·70	7·87							
		200	0·70	34·53	27·71	7·87	—	5·18					
		300	0·66	34·59	27·76	7·87							
		400	0·79	34·64	27·79	7·87	—	4·89					
		600	0·89	34·67	27·81	7·89	—	4·76					
		800	0·84	34·67	27·81	7·94	—	4·67					
		1000	0·78	34·68	27·82	7·94							
		1500	0·27	34·67	27·85	7·97	—	4·41					
		2000	0·13	34·67	27·85	7·97							
		2500	0·02	34·66	27·85	7·98	—	5·08					
		3000	−0·16	34·65	27·85	8·02							
		3500	−0·32	34·64	27·85	8·04	—	4·45					
619	2	0	−0·52	32·79	26·37	—	—	—	N 50 V	100–0	1005	1013	
									N 70 B	114–0	1022	1042	KT
									N 100 B				
620	2	0	−0·50	—	—	8·07	—	8·01	N 70 B	162–0	**2154**	**2214**	KT
		10	−0·50	32·74	26·32	8·07	—	—	N 100 B				
		20	−0·50	32·75	26·33	8·07	—	7·95	N 50 V	100–0	**2229**		
		30	−0·61	33·09	26·61	8·05	—	—	N 70 V	50–0			
		40	−1·20	34·16	27·50	7·97	—	7·22	,,	100–50			

Station 618:

Depth	Nitrate + Nitrite N_2 mgm./m.³
0	440
20	440
40	420
60	440
80	450
100	480
150	510
200	590
400	560
800	540
1500	540
2500	540
3500	540

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
620 *cont.*	59° 12′ S, 40° 23½′ W	1931 19–20 ii											
621	58° 50¼′ S, 38° 53′ W	20 ii	1000	3096*	WSW	24	WSW	4	o.	980·1	−2·8	−3·6	mod. W swell
622	59° 05½′ S, 36° 25′ W	20–21 ii	2215	1747*	W	15	W	3	o.	979·1	−3·0	−3·8	mod. W swell
			0003	—	W	12–20	W	3	o. p. s.	979·4	−3·5	−4·2	,,
623	59° 00¾′ S, 34° 11′ W	21 ii	1000	2800*	W N	3	W N	0–1	b. c.	977·6	−0·7	−2·0	mod. NW swell
624	58° 34¾′ S, 31° 21½′ W	21–22 ii	2235	3692*	NNW	3	NNW	1	c.	978·1	2·2	3·2	mod. conf. swell
			0050	—	—	0	—	0	c.	977·3	−2·2	−3·2	,,

Station	Age of moon (days)	Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	Remarks
620 *cont.*	3	50	−1·20	34·20	27·53	7·97	—	—	N 70 V	250–100			
		60	−1·20	34·23	27·56	7·96	—	6·92	,,	500–250			
		80	−1·04	34·29	27·60	7·94	—	—	,,	750–500			
		100	−0·72	34·31	27·60	7·92	—	6·21	,,	1000–750	—	2359	
		150	0·38	34·48	27·69	7·87							
		200	0·60	34·52	27·71	7·87	—	4·98					
		300	1·22	34·65	27·77	7·87							
		400	1·01	34·67	27·80	7·89	—	4·28					
		600	0·81	34·67	27·81	7·96	—	4·70					
		800	0·66	34·68	27·83	7·98	—	4·74					
		1000	0·43	34·67	27·84	7·99							
		1500	0·22	34·67	27·85	7·97	—	4·75					
		2000	0·05	34·67	27·86	7·98							
		2500	−0·19	34·66	27·86	7·99	—	5·09					
		3000	−0·40	34·65	27·86	8·02	—	5·29					

Depth	Nitrate + Nitrite N_2 mgm./m.³
0	460
20	460
40	500
60	500
80	520
100	600
150	580
200	560
400	540
800	540
1500	540
3000	540

Station	Age of moon (days)	Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	Remarks
621	3	0	0·25	33·18	26·65	—	—	—	N 50 V	100–0	1005	1013	
									N 70 B N 100 B	100–0	1020	1040	KT
622	3	0	−0·89	33·00	26·55	8·06	—	8·07	N 70 B N 100 B	155–0	2151	2211	KT
		10	−0·89	33·00	26·55	8·05	—	—					
		20	−0·89	33·00	26·55	8·06	—	8·03	N 50 V	100–0	2225		
		30	−0·91	33·00	26·55	8·06	—	—	N 70 V	50–0			
		40	−1·31	33·96	27·34	8·01	—	7·62	,,	100–50			
		50	−1·48	33·97	27·35	7·97	—	—	,,	250–100			
		60	−1·48	34·14	27·49	7·97	—	7·29	,,	500–250			
		80	−1·48	34·23	27·56	7·96	—	—	,,	750–500			
		100	−1·19	34·26	27·58	7·95	—	6·58	,,	1000–750	—	2353	
		150	−0·61	34·39	27·66	7·89							
		200	−0·20	34·48	27·72	7·87	—	5·58					
		300	0·53	34·58	27·76	7·86							
		400	0·78	34·65	27·80	7·87	—	4·92					
		600	0·59	34·67	27·83	7·92	—	4·63					
		800	0·56	34·68	27·84	7·97	—	4·63					
		1000	0·43	34·68	27·84	7·96							
		1500	0·24	34·67	27·85	7·97	—	4·81					

Depth	Nitrate + Nitrite N_2 mgm./m.³
0	380
20	360
40	400
60	400
80	440
100	440
150	460
200	520
400	520
800	540
1500	540

Station	Age of moon (days)	Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	Remarks
623	4	0	−0·40	33·11	26·62	—	—	—	N 50 V	100–0	1003	1011	
									N 70 B N 100 B	114–0	1021	1041	KT
624	5	0	0·22	33·31	26·75	8·07	—	7·84	N 70 B N 100 B	137–0	2208	2228	KT
		10	0·22	33·31	26·75	8·06	—	—					
		20	0·24	33·31	26·75	8·06	—	7·73	N 50 V	100–0	2235		
		30	0·31	33·38	26·80	8·07	—	—	N 70 V	50–0			
		40	0·07	33·54	26·95	8·05	—	7·82	,,	100–50			
		50	−1·16	33·91	27·30	7·98	—	—	,,	250–100			
		60	−1·19	34·06	27·42	7·97	—	6·99	,,	500–250			
		80	−0·86	34·18	27·50	7·92	—	—	,,	750–500			
		100	−0·73	34·24	27·55	7·89	—	6·47	,,	1000–750	—	0007	
		150	0·09	34·43	27·66	7·87							
		200	0·51	34·51	27·70	7·87	—	4·85					
		300	1·03	34·66	27·79	7·86							
		400	1·11	34·69	27·81	7·87	—	4·51					
		600	1·02	34·70	27·82	7·89	—	4·61					
		800	0·80	34·70	27·84	7·97	—	4·60					
		1000	0·63	34·70	27·85	7·96							
		1500	0·38	34·70	27·86	7·97	—	4·72					
		2000	0·14	34·68	27·86	7·98							
		2500	−0·02	34·67	27·86	7·99	—	5·14					
		3000	−0·11	34·66	27·86	7·98							
		3500	−0·18	34·65	27·85	7·97	—	5·21					

Depth	Nitrate + Nitrite N_2 mgm./m.³
0	300
20	320
40	360
60	380
80	420
100	440
150	500
200	540
400	520
800	500
1500	480
2500	480
3500	480

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
625	58° 02′ S, 29° 11½′ W	1931 22 ii	1000	3473*	—	0–2	—	0	c.	975·1	– 0·8	– 1·8	mod. conf. swell
626	57° 22′ S, 26° 29¾′ W	22 ii	2200	2377*	SW	6	SW	1	b. c.	974·1	– 1·8	– 3·0	mod. conf. swell
627	56° 53¾′ S, 23° 47½′ W	23 ii	1241	5483*	S × E	30	S × E	5	o. q. s.	978·9	– 0·7	– 0·7	heavy SE swell
628	55° 52¼′ S, 26° 44′ W	24 ii	1000	2783*	SW	25	SW	4	o. r. s.	1003·1	– 1·0	– 1·0	heavy SW swell
629	55° 33¾′ S, 30° 01′ W	25 ii	0053	3389*	NW	9	NW	1	b. v.	1015·6	– 0·2	– 1·0	mod. conf. swell
			0125	—	N × W	13	N × W	1	c.	1015·0	0·0	– 0·5	,,
630	53° 50′ S, 43° 17½′ W	3 iii	1720	2628*	SE	24	SE	5	o.	988·2	2·8	2·2	heavy conf. swell
631	54° 13½′ S, 47° 10′ W	4 iii	0953	3643*	W	18	W	3	b. c.	1002·0	6·8	6·2	mod. W swell
632	54° 25½′ S, 48° 33½′ W	4 iii	1730	4078*	NW × N	22	NW × W	4	o. m.	997·8	6·5	6·3	mod. conf. swell
633	54° 58¼′ S, 52° 16½′ W	5 iii	2000	4003*	WNW	13	WNW	4	b.	991·8	2·1	0·3	mod. NW swell
			2303	—	WSW	20	WSW	4	b.	991·2	2·0	1·1	mod. WNW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
625	5	0	0·18	33·40	26·83	—	—	—	N 50 V	100–0	1010	1018	
									N 70 B, N 100 B	114–0	1026	1046	KT
626	6	0	−0·09	33·62	27·02	—	—	—	N 50 V	100–0	**2200**	**2210**	
									N 70 B, N 100 B	158–0	**2217**	**2237**	KT
627	6	0	1·10	33·53	26·88	—	—	—	N 70 B, N 100 B	118–0	1249	1309	KT
628	7	0	−0·15	33·60	27·00	—	—	—	N 70 B, N 100 B	126–0	1007	1027	KT
629	8	0	0·11	33·51	26·92	8·08	—	7·99	N 70 B	152–0	**0100**	**0120**	KT
		10	0·11	33·51	26·92	8·08	—	—	N 100 B				
		20	0·11	33·51	26·92	8·08	—	8·00	N 50 V	100–0	**0127**		
		30	0·10	33·51	26·92	8·07	—	—	N 70 V	50–0			
		40	−0·04	33·51	26·93	8·06	—	7·94	,,	100–50			
		50	−0·91	33·77	27·17	8·02	—	—	,,	250–100			
		60	1·39	33·95	27·33	8·01	—	7·46	,,	500–250			
		80	−1·52	34·12	27·48	7·97	—	—	,,	750–500			
		100	−1·29	34·19	27·53	7·96	—	6·69	,,	1000–750	—	**0317**	
		150	−0·38	34·42	27·68	7·90							
		200	0·48	34·57	27·75	7·88	—	5·54					
		300	0·51	34·63	27·80	7·87							
		400	0·67	34·67	27·82	7·89	—	4·49					
		600	0·66	34·70	27·85	7·92	—	4·67					
		800	0·50	34·70	27·86	7·92	—	5·08					
		1000	0·41	34·70	27·86	7·96							
		1500	0·22	34·70	27·87	7·97	—	4·84					
		2000	−0·01	34·69	27·88	7·98							
		2500	−0·12	34·68	27·88	7·97	—	5·22					
		3000	−0·15	34·68	27·88	8·00	—	5·58					
630	14	0	3·40	34·03	27·10	—	—	—	N 70 H	0–5	1750	1755	
631	15	0	5·80	34·04	26·84	—	—	—	N 70 B, N 100 B	125–0	1019	1039	KT
632	15	0	4·85	33·96	26·89	—	—	—	N 70 H	0–1	1732	1735	
633	16	0	5·14	33·94	26·84	8·02	90	7·23	N 50 V	100–0	**2003**		
		10	5·13	33·94	26·84	8·02	92	—	N 70 V	50–0			
		20	5·12	33·94	26·84	8·01	91	7·22	,,	100–50			
		30	5·09	33·94	26·85	8·01	92	—	,,	250–100			
		40	5·02	33·94	26·85	8·01	92	7·21	,,	500–250			
		50	4·50	33·96	26·93	8·00	92	—	,,	750–500			
		60	3·46	33·97	27·04	7·98	93	7·32	,,	1000–750	—	**2144**	
		80	2·98	34·01	27·12	7·96	102	—	N 70 B	125–0	**2240**	**2300**	KT
		100	2·64	34·04	27·17	7·95	102	7·02	N 100 B				
		150	2·30	34·05	27·21	7·93	103						
		200	1·39	34·06	27·29	7·93	109	7·25					
		300	1·50	34·06	27·28	7·91	114						
		400	1·81	34·15	27·33	7·89	118	5·90					
		600	2·06	34·36	27·47	7·87	126	4·63					
		800	2·19	34·49	27·57	7·88	130	4·22					
		1000	2·18	34·59	27·65	7·87	125						
		1500	1·99	34·68	27·74	7·91	125	4·14					
		2000	1·66	34·70	27·78	7·92	124						
		2500	1·24	34·69	27·80	7·96	116	4·55					
		3000	0·85	34·68	27·82	7·94	116						
		3500	0·51	34·67	27·83	7·95	118	4·89					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
634	56° 14½′ S, 51° 06¾′ W	1931 6 iii	0900	4239*	NNW	10	NNW	3	c.	985·5	6·0	5·5	heavy WNW swell
			1440	—	NNE	13	NNE	2	o. m.	980·5	4·8	4·7	heavy conf. swell
635	57° 42¾′ S, 50° 06¼′ W	7 iii	2014	4003*	SW	5	SW	3	o. s.	991·0	0·5	0·4	heavy conf. swell
			2250	—	WSW	10	WSW	3	o. s. q.	990·2	0·2	0·0	,,
636	59° 01¾′ S, 49° 18½′ W	8 iii	0830	4005*	SW W	10	SW W	3	o. m. s.	987·0	−0·2	−0·2	mod. SW swell
			1234	—	S E	10	S E	2	c.	988·1	−0·5	−1·1	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
634	17	0	4·57	33·89	26·87	8·00	85	7·42	**N 70 B**	173–0	0908	0928	KT
		10	4·41	33·95	26·93	8·00	89	—	**N 100 B**				
		20	4·40	33·95	26·93	8·00	90	7·34	**N 50 V**	100–0	0935		
		30	4·40	33·95	26·93	8·00	90	—	**N 70 V**	50–0			
		40	4·40	33·95	26·93	8·00	90	7·35	,,	100–50			
		50	4·19	33·96	26·96	7·99	90	—	,,	250–100			
		60	3·40	33·99	27·06	7·98	97	7·45	,,	500–250			
		80	1·91	34·05	27·24	7·96	110	—	,,	750–500			
		100	1·47	34·05	27·27	7·95	122	7·41	,,	1000–750	—	1435	
		150	1·01	34·05	27·30	7·94	127						
		200	1·19	34·07	27·31	7·92	132	7·30					
		300	1·80	34·20	27·37	7·90	145						
		400	1·82	34·30	27·44	7·87	147	5·47					
		600	2·09	34·42	27·52	7·86	156	4·45					
		800	2·26	34·58	27·63	7·88	156	4·14					
		1000	2·15	34·63	27·68	7·87	153						
		1500	1·85	34·71	27·77	7·88	151	4·29					
		2000	1·48	34·71	27·80	7·94	148						
		2500	1·05	34·70	27·82	7·97	147	4·62					
		3000	0·72	34·68	27·83	7·94	142						
		3500	0·46	34·67	27·84	7·97	142	4·73					
		4000	0·35	34·67	27·84	7·96	142	5·02					
635	17	0	2·82	33·88	27·03	7·98	103	7·72	**N 50 V**	100–0	**2017**		
		10	2·82	33·88	27·03	7·97	110	—	**N 70 V**	50–0			
		20	2·82	33·88	27·03	7·97	112	7·66	,,	100–50			
		30	2·82	33·88	27·03	7·97	112	—	,,	250–100			
		40	2·82	33·88	27·03	7·97	112	7·32	,,	500–250	—	**2250**	
		50	2·82	33·88	27·03	7·96	112	—	**N 70 B**	180–0	**2300**	**2320**	KT
		60	2·80	33·88	27·03	7·96	113	7·69	**N 100 B**				
		80	0·71	34·01	27·29	7·93	118						
		100	0·19	34·02	27·33	7·91	145	7·44					
		150	0·40	34·18	27·44	7·87	140						
		200	1·51	34·33	27·49	7·85	140	5·52					
		300	1·72	34·43	27·56	7·83	150						
		400	2·14	34·53	27·60	7·82	140	4·48					
		600	1·99	34·65	27·71	7·86	140	4·19					
		800	1·88	34·68	27·75	7·89	140	4·21					
		1000	1·75	34·71	27·78	7·87	135						
		1500	1·37	34·71	27·81	7·92	135	4·44					
		2000	0·87	34·70	27·83	7·94	135						
		2500	0·59	34·70	27·85	7·93	135	4·88					
		3000	0·27	34·69	27·86	7·93	135						
		3500	0·02	34·68	27·87	7·94	136	5·27					
636	18	0	1·22	34·11	27·34	7·97	100	7·62	**N 70 B**	180–0	0843	0903	KT
		10	1·20	34·11	27·34	7·97	102	—	**N 100 B**	164–0	0915	0935	KT
		20	1·18	34·12	27·35	7·97	103	7·71	**N 50 V**	100–0	0941		
		30	1·16	34·13	27·36	7·96	103	—	**N 70 V**	50–0			
		40	1·14	34·16	27·38	7·96	103	7·66	,,	100–50			
		50	1·08	34·16	27·39	7·96	106	—	,,	250–100			
		60	0·84	34·16	27·40	7·95	108	7·39	,,	500–250			
		80	0·42	34·26	27·51	7·91	121	—	,,	750–500			
		100	0·24	34·26	27·52	7·91	123	6·72	,,	1000–750	—	1230	
		150	0·24	34·35	27·59	7·90	123						
		200	0·49	34·37	27·59	7·91	124	6·58					
		300	0·78	34·50	27·68	7·86	129						
		400	1·46	34·59	27·71	7·86	129	4·94					
		600	1·09	34·64	27·77	7·88	137	4·68					
		800	0·70	34·66	27·81	7·91	135	5·16					
		1000	0·67	34·66	27·81	7·91	135						
		1500	0·19	34·62	27·81	7·92	135	5·17					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
636 *cont.*	59° $01\frac{3}{4}'$ S, 49° $18\frac{1}{2}'$ W	1931 8 iii											
637	60° $00\frac{1}{4}'$ S, 49° $28\frac{1}{4}'$ W	8 iii	1900	3862*	SE × E	18–20	SE × E	3	o.	991·7	− 2·5	− 2·5	mod. SE swell
			2212	—	ESE	12	ESE	3	b.	995·2	− 2·5	− 3·1	slight conf. swell
638	61° $00\frac{1}{2}'$ S, 49° $48\frac{1}{2}'$ W	9 iii	0534	2698*	W × N	10–12	W × N	2	b.	1000·3	− 3·0	− 3·0	slight SW swell
			0745	—	WSW	19	WSW	3	b. c.	1000·5	− 1·8	− 2·0	mod. WSW swell
639	61° $57\frac{3}{4}'$ S, 51° 59′ W	9 iii	2105	2857*	WSW	24	WSW	4	b. q.	991·3	− 0·5	− 1·6	slight SW swell; among innumerable bergs

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To	
636 *cont.*	19	2000	0·04	34·62	27·82	7·93	135						
		2500	−0·10	34·62	27·82	7·97	135	5·23					
		3000	−0·18	34·61	27·82	7·96	135						
		3500	−0·27	34·61	27·83	7·96	130	5·28					
637	19	0	0·52	34·35	27·57	7·89	124	7·30	**N 50 V**	100–0	1907		
		10	0·54	34·35	27·57	7·88	126	—	**N 70 V**	50–0			
		20	0·54	34·37	27·59	7·88	126	7·34	,,	100–50			
		30	0·54	34·37	27·59	7·88	116	—	,,	250–100			
		40	0·54	34·37	27·59	7·88	126	7·30	,,	500–250			
		50	0·54	34·38	27·60	7·88	126	—	,,	750–500			
		60	0·51	34·38	27·60	7·87	123	7·17	,,	1000–750	—	**2028**	
		80	0·51	34·38	27·60	7·87	126	—	**N 70 B** **N 100 B**	156–0	**2146**	**2206**	KT
		100	0·50	34·41	27·62	7·87	126	7·10					
		150	0·44	34·41	27·62	7·87	126						
		200	0·41	34·42	27·63	7·86	126	6·54					
		300	0·33	34·47	27·68	7·84	126						
		400	−0·22	34·50	27·73	7·85	126	6·12					
		600	0·03	34·57	27·78	7·84	126	5·44					
		800	0·02	34·59	27·80	7·87	126	5·53					
		1000	−0·07	34·61	27·82	7·86	126						
		1500	−0·19	34·62	27·83	7·92	129	5·22					
		2000	−0·11	34·62	27·83	7·93	132						
		2500	−0·21	34·63	27·84	7·97	132	5·19					
		3000	−0·30	34·61	27·83	7·94	132						
		3500	−0·35	34·61	27·83	7·96	126	5·47					
638	20	0	−0·20	33·37	26·82	7·94	112	8·24	**N 70 B** **N 100 B**	155–0	0509	0529	KT
		10	−0·19	33·38	26·83	7·94	104	—					
		20	−0·02	33·54	26·95	7·93	104	8·13	**N 50 V**	100–0	0537		
		30	−0·01	33·89	27·23	7·91	104	—	**N 70 V**	50–0			
		40	−0·09	34·01	27·33	7·91	121	7·76	,,	100–50			
		50	−0·11	34·07	27·38	7·91	128	—	,,	250–100			
		60	−0·11	34·07	27·38	7·91	129	7·68	,,	500–250			
		80	−0·12	34·11	27·41	7·90	136	—	,,	750–500			
		100	−0·52	34·27	27·56	7·87	137	7·21	,,	1000–750	—	0730	
		150	−0·85	34·42	27·69	7·85	137						
		200	−0·74	34·48	27·74	7·86	137	6·27					
		300	−0·49	34·50	27·75	7·83	141						
		400	−0·37	34·54	27·77	7·82	148	6·10					
		600	−0·40	34·58	27·81	7·83	144	5·61					
		800	−0·19	34·59	27·81	7·86	141	5·38					
		1000	−0·19	34·59	27·81	7·89	141						
		1500	−0·38	34·59	27·81	7·93	139	5·57					
		2000	−0·50	34·60	27·83	7·94	135						
		2500	−0·60	34·60	27·83	7·94	137	5·73					
639	21	0	−0·76	33·85	27·23	7·93	112	7·43	**N 50 V**	100–0	**2107**		
		10	−0·77	33·85	27·23	7·92	114	—	**N 70 V**	50–0			
		20	−0·77	33·85	27·23	7·92	116	7·44	,,	100–50			
		30	−0·80	33·97	27·33	7·91	122	—	,,	250–100			
		40	−0·99	34·22	27·54	7·91	122	6·98	,,	500–250			
		50	−0·99	34·23	27·55	7·90	122	—	,,	750–500			
		60	−1·03	34·26	27·58	7·90	142	6·75	,,	1000–750	—	**2240**	
		80	−1·06	34·29	27·60	7·90	142	—	**N 70 B** **N 100 B**	132–0	**2303**	**2323**	KT
		100	−1·09	34·33	27·63	7·90	141	6·58					
		150	−1·01	34·39	27·68	7·86	140						
		200	−0·74	34·48	27·74	7·87	140	5·62					
		300	−0·04	34·58	27·79	7·85	132						
		400	0·29	34·60	27·79	7·86	135	4·89					
		600	0·32	34·61	27·80	7·86	139	4·36					
		800	0·34	34·62	27·80	7·90	140	4·55					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
639 *cont.*	61° 57¾′ S, 51° 59′ W	1931 9 iii											
640	61° 26½′ S, 53° 47½′ W	10 iii	0930	658*	WSW	20	WSW	3	b. c.	998·5	0·2	−0·5	mod. conf. swell
641	61° 58′ S, 53° 54½′ W	10 iii	1400	554*	W × N	20	W × N	3	o.	994·3	0·3	−0·2	mod. W swell
642	61° 51½′ S, 54° 58′ W	10 iii	1810	1686*	W	20	W	4	o.	995·9	1·0	0·5	mod. W swell
643	61° 44½′ S, 56° 07′ W	10 iii	2310	812*	NW × W	17	NW × W	3	o. f.	993·4	1·3	1·3	mod. W swell
644	61° 20½′ S, 56° 40′ W	11 iii	0635	298*	W × S	16	W	3	o. m.	990·0	1·5	1·5	mod. WNW swell
645	60° 51½′ S, 57° 12¾′ W	11 iii	1139	2526*	SW × W	14	SW × W	3	o. m.	990·5	1·9	1·9	mod. W swell
646	60° 22½′ S, 57° 43′ W	11 iii	1531	2622*	SW × W	12	SW × W	2	o. m.	990·3	2·1	2·0	mod. W swell
647	59° 29¼′ S, 58° 39¾′ W	12 iii	0104	3533*	SSW	17–19	SSW	3	o.	994·4	1·5	−1·0	mod. W swell
			0340	—	SW	20	SW	3	o.	994·9	1·0	−1·0	,,

Station	Age of moon (days)	Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Gear	Depth (metres)	Time From	Time To	Remarks	Depth	Nitrite N_2 mgm./m.³	Nitrate + Nitrite N_2 mgm./m.³
639 *cont.*	21	1000	0·26	34·64	27·82	7·91	140									
		1500	−0·01	34·62	27·82	7·96	140	4·78								
		2000	−0·31	34·61	27·83	7·92	140									
		2500	−0·54	34·61	27·84	7·97	139	5·13								
640	21	0	−0·20	34·30	27·57	—	—	—	N 70 B N 100 B	164–0	0940	1000	KT			
641	21	0	0·38	34·39	27·61	—	—	—	N 70 B N 100 B	173–0	1408	1428	KT			
642	21	0	0·70	34·23	27·47	—	—	—	N 70 B N 100 B	180–0	1815	1835	KT			
643	22	0	0·60	34·24	27·48	—	—	—	N 70 B N 100 B	93–0	**2312**	**2332**	KT			
644	22	0	1·51	34·02	27·24	7·94	—	7·12	N 70 B N 100 B	100–0	0635	0655	KT	0	4·4	460
		10	1·49	34·04	27·26	7·94	—	—						10	4·5	
		20	1·35	34·06	27·29	7·94	—	7·10	N 50 V	100–0	0700			20	4·1	460
		30	1·20	34·06	27·30	7·92	—	—	N 70 V	50–0				30	4·3	
		40	1·16	34·06	27·30	7·92	—	6·96	,,	100–50				40	3·3	460
		50	1·13	34·08	27·32	7·92	—	—	,,	250–100	—	0732		50	3·3	
		60	1·11	34·09	27·33	7·92	—	6·89						60	3·6	480
		80	1·01	34·10	27·34	7·91								80	4·3	460
		100	0·91	34·20	27·43	7·90	—	6·42						100	5·4	460
		150	0·98	34·41	27·59	7·86								150	3·0	480
		200	0·98	34·43	27·61	7·84	—	5·43						200	2·4	500
		275	0·71	34·56	27·73	7·83	—	5·12						275	0·1	520
645	22	0	1·85	33·80	27·04	—	—	—	N 50 V	100–0	1143	1152				
646	22	0	2·33	33·82	27·02	7·94	—	7·17	N 50 V	100–0	1537			0	5·3	
		10	2·32	33·82	27·02	7·94	—	—	N 70 V	50–0				10	5·3	
		20	2·28	33·82	27·03	7·94	—	7·12	,,	100–50				20	5·4	
		30	2·21	33·82	27·03	7·94	—	—	,,	250–100				30	5·0	
		40	2·18	33·83	27·04	7·94	—	7·14	,,	500–250				40	4·9	
		50	1·39	33·86	27·13	7·93	—	—	,,	750–500				50	4·3	
		60	0·02	33·96	27·29	7·91	—	7·01	,,	1000–750	—	1700		60	2·7	
		80	−0·70	34·04	27·38	7·88	—	—	N 70 B N 100 B	155–0	1721	1741	KT	80	3·3	
		100	0·09	34·22	27·49	7·86	—	6·07						100	2·0	
		150	1·31	34·42	27·58	7·83								150	0·7	
		200	1·82	34·52	27·62	7·81	—	3·85						200	0·1	
		300	2·17	34·59	27·65	7·81								300	0·0	
		400	2·17	34·63	27·68	7·82	—	3·97						400	0·0	
		600	1·87	34·65	27·72	7·83	—	4·00						600	0·0	
		800	1·72	34·69	27·77	7·85	—	4·07						800	0·0	
		1000	1·60	34·69	27·78	7·86								1000	0·0	
		1500	1·13	34·71	27·83	7·88	—	4·32						1500	0·0	
		2000	0·81	34·69	27·83	7·91								2000	0·0	
		2500	0·48	34·69	27·85	7·90	—	4·49						2500	0·0	
647	23	0	2·72	33·87	27·03	7·96	—	7·22	N 70 B N 100 B	132–0	**0039**	**0059**	KT	0	5·2	490
		10	2·72	33·87	27·03	7·96	—	—						10	5·2	
		20	2·73	33·88	27·04	7·97	—	7·20	N 50 V	100–0	**0110**			20	5·0	470
		30	2·66	33·89	27·05	7·96	—	—	N 70 V	50–0				30	5·0	
		40	2·31	33·91	27·10	7·95	—	7·10	,,	100–50				40	4·7	490
		50	1·23	34·03	27·27	7·92	—	—	,,	250–100				50	5·1	
		60	1·01	34·04	27·29	7·91	—	6·85	,,	500–250				60	5·0	490
		80	0·62	34·11	27·38	7·90	—	—	,,	750–500				80	5·5	500
		100	0·43	34·19	27·45	7·88	—	6·17	,,	1000–750	—	**0328**		100	5·8	500
		150	0·69	34·33	27·55	7·83								150	2·9	510

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. °C.		Remarks
					Direction	Force (knots)	Direction	Force			Dry bulb	Wet bulb	
647 *cont.*	59° 29¼′ S, 58° 39¾′ W	1931 12 iii											
648	58° 30¾′ S, 59° 41¼′ W	12 iii	1100	3541*	SW × S	13	SW × S	3	o.	1001·8	1·6	0·0	mod. SW swell
649	57° 43½′ S, 60° 22¼′ W	12–13 iii	2329	4065*	N × E	10	N	2	o.	1007·7	4·0	3·0	mod. SW swell
			0445	—	N × W	14	N × W	3	o. d.	1005·8	6·5	6·3	,,
650	56° 19¼′ S, 62° 12¼′ W	13 iii	1400	4113*	NW × W	5–9	NW × W	2	c.	1006·8	7·2	6·5	mod. W × N swell
			1706	—	NNW	12	NNW	2	o.	1006·2	7·0	6·4	mod. W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks	Depth	Nitrite N_2 mgm./m.³	Nitrate + Nitrite N_2 mgm./m.³
647 *cont.*	23	200	1.30	34.47	27.62	7.82	—	4.55						200	0.3	510
		300	1.90	34.60	27.68	7.81								300	0.0	
		400	2.01	34.69	27.75	7.82	—	3.93						400	0.0	500
		600	1.72	34.70	27.77	7.85	—	4.06						600	0.0	
		800	1.57	34.73	27.81	7.86	—	4.10						800	0.0	500
		1000	1.34	34.73	27.83	7.87								1000	0.0	
		1500	0.84	34.70	27.84	7.91	—	4.37						1500	0.0	500
		2000	0.56	34.68	27.84	7.93								2000	0.0	
		2500	0.37	34.68	27.85	7.92	—	4.49						2500	0.0	500
		3000	0.05	34.65	27.84	7.96								3000	0.0	
		3400	−0.11	34.68	27.87	7.93	—	4.98						3400	0.0	500
648	23	0	3.74	33.84	26.91	7.97	—	7.00	**N 50 V**	100–0	1106			0	5.2	
		10	3.75	33.84	26.91	7.97	—	—	**N 70 V**	50–0				10	5.1	
		20	3.76	33.85	26.92	7.97	—	6.96	,,	100–50				20	4.9	
		30	3.63	33.86	26.94	7.97	—	—	,,	250–100				30	4.9	
		40	2.92	33.87	27.01	7.96	—	7.13	,,	500–250				40	4.5	
		50	1.31	33.89	27.16	7.95	—	—	,,	750–500				50	3.6	
		60	1.24	33.97	27.22	7.93	—	7.14	,,	1000–750	—	1239		60	2.4	
		80	1.11	34.07	27.31	7.91	—	—	**N 70 B**	135–0	1332	1352	KT	80	0.0	
		100	1.23	34.11	27.33	7.90	—	6.55	**N 100 B**					100	0.0	
		150	1.71	34.15	27.33	7.87								150	0.0	
		200	2.12	34.30	27.42	7.86	—	5.08						200	0.0	
		300	2.29	34.40	27.49	7.83								300	0.0	
		400	2.33	34.49	27.56	7.83	—	4.12						400	0.0	
		600	2.20	34.57	27.63	7.84	—	3.78						600	0.0	
		800	2.06	34.67	27.73	7.84	—	3.83						800	0.0	
		1000	1.90	34.70	27.76	7.86								1000	0.0	
		1500	1.59	34.71	27.79	7.87	—	4.03						1500	0.0	
		2000	1.19	34.70	27.81	7.92								2000	0.0	
		2500	0.84	34.69	27.83	7.92	—	4.32						2500	0.0	
		3000	0.57	34.67	27.84	7.93								3000	0.0	
649	23	0	6.71	34.03	26.71	7.98	—	6.58	**N 70 B**	170–0	**2306**	**2326**	KT	0	4.7	450
		10	6.71	34.04	26.72	7.98	—	—	**N 100 B**					10	4.8	
		20	6.63	34.04	26.73	7.98	—	6.51	**N 50 V**	100–0	**2331**			20	4.9	420
		30	6.63	34.04	26.73	7.98	—	—	**N 70 V**	50–0				30	4.7	
		40	6.60	34.07	26.76	7.97	—	6.48	,,	100–50				40	5.0	450
		50	6.42	34.07	26.78	7.97	—	—	,,	250–100				50	5.2	
		60	6.23	34.09	26.82	7.97	—	6.30	,,	500–250				60	5.3	460
		80	5.00	34.11	26.99	7.96	—	—	,,	750–500				80	5.7	490
		100	4.71	34.12	27.03	7.96	—	6.57	,,	1000–750	—	**0134**		100	4.9	500
		150	4.06	34.14	27.12	7.94								150	0.6	500
		200	3.73	34.14	27.15	7.92	—	6.20						200	0.0	500
		300	2.84	34.14	27.23	7.91								300	0.0	
		400	2.23	34.14	27.29	7.91	—	6.23						400	0.0	520
		600	2.30	34.29	27.40	7.86	—	4.77						600	0.0	
		800	2.44	34.47	27.53	7.83	—	4.76						800	0.0	520
		1000	2.46	34.49	27.55	7.86								1000	0.0	
		1500	2.25	34.61	27.65	7.90	—	4.21						1500	0.0	520
		2000	2.06	34.68	27.73	7.90								2000	0.0	
		2500	1.81	34.71	27.78	7.92	—	3.65						2500	0.0	520
		3000	1.27	34.71	27.82	7.92								3000	0.0	
		3500	0.95	34.69	27.82	7.96	—	3.82						3500	0.0	
		3900	0.94	34.69	27.82	7.93								3900	0.0	510
650	24	0	7.22	34.08	26.68	7.99	—	6.56	**N 50 V**	100–0	1405			0	4.8	
		10	7.13	34.08	26.69	7.99	—	—	**N 70 V**	50–0				10	4.9	
		20	7.12	34.09	26.71	7.99	—	6.54	,,	100–50				20	4.8	
		30	7.12	34.09	26.71	7.99	—	—	,,	250–100				30	4.9	
		40	7.10	34.09	26.71	7.99	—	6.52	,,	500–250				40	4.8	
		50	6.94	34.09	26.73	7.98	—	—	,,	750–500				50	5.0	

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
650 *cont.*	56° 19¼′ S, 62° 12¼′ W	1931 13 iii											
651	55° 08′ S, 63° 31′ W	14 iii	0333	1730*	SW × W	12	SW × W	2	c.	1003·4	8·0	7·5	slight W swell
652	Burdwood Bank; 54° 04′ S, 61° 40′ W	14 iii	1505 1510 1550 1610	187* 174* 171 169	—	2	SSW	1	o.	1000·8	6·2	6·2	
653	53° 58½′ S, 54° 11¾′ W	21 iii	1445	1856*	NNW	19	NNW	3	c.	1009·3	7·0	6·1	mod. NW swell
654	52° 52½′ S, 51° 14½′ W	23 iii	0912	—	NNW	29	NNW	6	b. c.	983·0	7·5	7·2	heavy NW swell
655	53° 30½′ S, 50° 40¾′ W	23 iii	1540	2593*	NW × W	28	NW	6	b.	984·5	7·2	5·6	heavy NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks	Depth	Nitrite N_2 mgm./m.³	Nitrate + Nitrite N_2 mgm./m.³
650 *cont.*	24	60	6·82	34·10	26·75	7·97	—	6·49	**N 70 V**	1000–750	—	1527		60	5·0	
		80	5·86	34·10	26·88	7·96	—	—	**N 70 B**	156–0	1641	1701	KT	80	6·3	
		100	5·14	34·14	27·00	7·96	—	6·43	**N 100 B**					100	5·4	
		150	4·80	34·18	27·07	7·95								150	0·4	
		200	4·49	34·18	27·10	7·95	—	6·40						200	0·0	
		300	4·02	34·18	27·15	7·94								300	0·0	
		400	3·72	34·19	27·19	7·92	—	5·76						400	0·0	
		600	3·01	34·25	27·31	7·90	—	5·05						600	0·0	
		800	2·43	34·31	27·40	7·87	—	4·66						800	0·0	
		1000	2·46	34·47	27·53	7·84								1000	0·0	
		1500	2·22	34·64	27·69	7·85	—	4·14						1500	0·0	
		2000	2·06	34·71	27·76	7·88								2000	0·0	
		2500	1·83	34·71	27·77	7·92	—	3·90						2500	0·0	
		3000	1·55	34·70	27·79	7·92								3000	0·0	
		3500	1·19	34·69	27·81	7·94	—	4·16						3500	0·0	
		4000	0·98	34·69	27·82	7·94	—	4·29						4000	0·0	
651	25	0	7·23	34·05	26·66	8·01	—	6·39	**N 70 B**	155–0	0339	0359	KT	0	5·1	360
		10	7·23	34·05	26·66	8·01	—	—	**N 100 B**					10	4·8	
		20	7·23	34·05	26·66	8·01	—	6·37	**N 50 V**	100–0	0405			20	4·6	360
		30	7·23	34·05	26·66	8·00	—	—	**N 70 V**	50–0				30	4·5	
		40	7·14	34·08	26·69	8·01	—	6·40	,,	100–50				40	4·4	360
		50	7·10	34·09	26·71	8·00	—	—	,,	250–100				50	5·1	
		60	6·71	34·10	26·77	7·99	—	6·29	,,	500–250				60	5·7	360
		80	6·33	34·11	26·83	7·98	—	—	,,	750–500				80	6·1	360
		100	5·56	34·17	26·97	7·97	—	6·29	,,	1000–750	—	0544		100	2·7	370
		150	5·04	34·18	27·04	7·97								150	0·0	370
		200	4·93	34·18	27·05	7·97	—	6·36						200	0·0	390
		300	4·80	34·18	27·07	7·97								300	0·0	
		400	4·53	34·18	27·10	7·97	—	6·24						400	0·0	400
		600	3·74	34·19	27·19	7·97	—	5·83						600	0·0	
		800	3·21	34·20	27·25	7·96	—	5·24						800	0·0	410
		1000	2·94	34·29	27·35	7·91								1000	0·0	
		1500	2·40	34·56	27·61	7·90	—	3·68						1500	0·0	420
652	25	0	7·62	34·09	26·63	—	—	—	**DLH**	164	1510	1512				
		172	6·10	34·10	26·85	—	—	—	**OTL**							
									N 7–T	171–169	1550	1607	Net badly torn			
									N 4–T							
653	2	0	6·22	34·08	26·82	7·98	—	—	**N 70 B**	100–0	1422	1442	KT			
		10	6·21	34·08	26·82	7·98	—	—	**N 100 B**							
		20	6·12	34·08	26·83	7·98	—	—	**N 50 V**	100–0	1453					
		30	6·12	34·08	26·83	7·98	—	—	**N 70 V**	50–0						
		40	6·10	34·08	26·83	7·98	—	—	,,	100–50						
		50	6·05	34·08	26·84	7·98	—	—	,,	250–100						
		60	6·05	34·08	26·84	7·98	—	—	,,	500–250						
		80	5·82	34·09	26·87	7·98	—	—	,,	750–500						
		100	4·79	34·11	27·01	7·96	—	—	,,	1000–750	—	1628				
		150	4·16	34·18	27·14	7·94										
		200	3·82	34·18	27·17	7·92										
		300	3·51	34·18	27·20	7·92										
		400	2·93	34·18	27·26	7·91										
		600	2·43	34·18	27·30	7·93										
		800	2·14	34·24	27·37	7·92										
		1000	2·33	34·41	27·49	7·87										
		1500	2·28	34·61	27·66	7·83										
654	4	0	5·60	34·18	26·97	—	—	—	**N 70 H**	0–5	0912	0917				
655	4	0	5·99	34·10	26·86	7·98	—	—	**N 50 V**	100–0	1545					
		10	5·99	34·10	26·86	7·98	—	—	**N 70 V**	50–0						

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
655 *cont.*	53° 30½′ S, 50° 40¾′ W	1931 23 iii	1823	—	WNW	26	WNW	6	b. c.	984·7	7·0	5·5	heavy conf. swell
656	53° 19¼′ S, 47° 53′ W to 53° 15¾′ S, 47° 56¾′ W	24 iii	0638	3486*	W × N	27–30	W × N	5	b. c.	988·0	5·0	3·2	heavy NW swell
			1015	—	WNW	15	W × N	5	b. c.	990·1	3·8	3·2	,,
657	53° 31½′ S, 44° 23¾′ W	25 iii	0935	2123*	WNW	30–32	WNW	6	o. q. r.	975·8	4·6	4·2	heavy NW swell
			1237	—	W × S	20	W	6	c.	983·7	5·0	3·5	,,
658	53° 38¼′ S, 40° 27¼′ W	26 iii	0555	2454*	NW × N	25	NW × N	5	o.	997·4	4·0	3·5	heavy W swell
			0825	—	NW	22	NW	5	b. c.	998·6	4·0	3·8	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
655 *cont.*		20	5·98	34·10	26·86	7·98	—	—	**N 70 V**	100–50			
		30	5·98	34·10	26·86	7·98	—	—	,,	250–100			
		40	5·90	34·11	26·88	7·98	—	—	,,	500–250			
		50	5·90	34·11	26·88	7·98	—	—	,,	750–500			
		60	5·89	34·11	26·88	7·98	—	—	,,	1000–750	—	1810	
		80	5·89	34·11	26·88	7·98	—	—	**N 70 B**	160–0	1827	1847	KT
		100	5·12	34·16	27·01	7·97	—	—	**N 100 B**				
		150	4·31	34·19	27·13	7·96							
		200	4·08	34·19	27·15	7·95							
		300	3·89	34·19	27·17	7·95							
		400	3·50	34·19	27·21	7·95							
		600	2·69	34·18	27·28	7·94							
		800	2·45	34·20	27·32	7·92							
		1000	2·54	34·33	27·41	7·91							
		1500	2·23	34·61	27·66	7·88							
656	5	0	4·78	34·01	26·93	7·98	—	—	**N 70 B**	180–0	0612	0632	KT
		10	4·78	34·01	26·93	7·98	—	—	**N 50 V**	100–0	0637		
		20	4·78	34·01	26·93	7·98	—	—	**N 70 V**	50–0			
		30	4·77	34·01	26·93	7·98	—	—	,,	100–50			
		40	4·77	34·02	26·94	7·98	—	—	,,	250–100			
		50	4·39	34·05	27·01	7·97	—	—	,,	500–250			
		60	3·80	34·14	27·14	7·96	—	—	,,	750–500			
		80	3·26	34·14	27·20	7·94	—	—	,,	1000–750	—	0945	
		100	2·99	34·12	27·20	7·93	—	—	**N 100 B**	135–0	1016	1036	KT
		150	2·62	34·14	27·25	7·92							
		200	2·41	34·14	27·27	7·91							
		300	1·76	34·14	27·32	7·91							
		400	2·24	34·25	27·37	7·90							
		600	2·46	34·35	27·43	7·89							
		800	2·37	34·52	27·58	7·87							
		1000	2·34	34·54	27·60	7·86							
		1500	2·04	34·56	27·64	7·89							
		2000	1·62	34·71	27·79	7·94							
		2500	1·20	34·71	27·82	7·93							
		3000	0·86										
657	6	0	2·19	33·84	27·05	7·98	—	—	**N 100 B**	155–0	0911	0931	KT
		10	2·19	33·84	27·05	7·98	—	—	**N 50 V**	100–0	0949		
		20	2·16	33·84	27·05	7·98	—	—	**N 70 V**	50–0			
		30	2·16	33·84	27·05	7·98	—	—	,,	100–50			
		40	2·15	33·84	27·05	7·98	—	—	,,	250–100			
		50	2·12	33·84	27·05	7·98	—	—	,,	500–350			
		60	2·12	33·84	27·05	7·98	—	—	,,	750–500	—	1230	
		80	2·00	33·89	27·11	7·96							
		100	1·36	34·01	27·25	7·92							
		150	1·04	34·07	27·32	7·91							
		200	1·20	34·17	27·39	7·89							
		300	1·56	34·29	27·46	7·86							
		400	1·88	34·43	27·55	7·84							
		600	2·07	34·54	27·62	7·86							
		800	2·03	34·61	27·68	7·87							
		1000	1·96	34·63	27·70	7·88							
		1500	1·68	34·69	27·77	7·90							
		1900	1·18	34·70	27·82	7·90							
658	7	0	2·64	33·88	27·04	7·97	—	—	**N 70 B**	120–0	0527	0547	KT
		10	2·64	33·88	27·04	7·97	—	—	**N 100 B**				
		20	2·64	33·88	27·04	7·97	—	—	**N 50 V**	100–0	0554		
		30	2·64	33·88	27·04	7·97	—	—	**N 70 V**	50–0			
		40	2·64	33·88	27·04	7·97	—	—	,,	100–50			
		50	2·62	33·88	27·05	7·97	—	—	,,	250–100			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
658 *cont.*	53° 38¾′ S, 40° 27¼′ W	1931 26 iii											
659	53° 56½′ S, 40° 09½′ W	26 iii	1054	2118*	NW × N	25	NW × N	5	c.	998·6	4·5	3·9	heavy NW swell
			1322	—	NW × N	28	NW × N	5	b. c.	998·6	4·0	3·5	,,
660	6 cables E of Hope Pt, E Cumberland Bay, S. Georgia	31 iii	0548	212*	S	5	S	1	b. c.	1005·2	5·0	2·5	mod. N swell
661	57° 36′ S, 29° 54½′ W to 57° 36′ S, 29° 35′ W	2 iv	0245	3418*	W	10	W	2	o. c.	1003·3	−4·5	−4·9	slight W swell
			0800	—	W × N	5	W × N	2	o.	1001·2	−2·12	−2·6	slight WSW swell
			1656	—	NW × W	14	NW	3	o.	999·8	−2·3	−2·7	mod. NW swell
662	55° 56′ S, 29° 57′ W	3 iv	0430	3400*	NW × W	20	NW × W	3	o.	1001·2	−0·5	−0·6	mod. NW swell
663	53° 34½′ S, 30° 25¾′ W to 53° 32¼′ S, 30° 20′ W	4 iv	0135	3948*	NW × W	25	NW × W	4	o. q.	1000·0	1·7	1·5	mod. WNW swell
			0400	—	W	42	W	4	o.	998·4	1·7	1·4	heavy W swell

Station	Age of moon (days)	Hydrological observations: Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p.l.	Biological observations: Gear	Depth (metres)	Time: From	Time: To	Remarks	Depth	Nitrite N_2 mgm./m.^{3}	Nitrate + Nitrite N_2 mgm./m.^{3}
658 *cont.*	7	60	2·58	33·88	27·05	7·97	—	—	**N 70 V**	500–250						
		80	1·40	33·97	27·21	7·93	—	—	,,	750–500						
		100	0·72	34·07	27·34	7·90	—	—	,,	1000–750	—	0806				
		150	0·70	34·17	27·42	7·86										
		200	0·90	34·22	27·45	7·85										
		300	1·41	34·34	27·51	7·83										
		400	1·89	34·46	27·57	7·82										
		600	2·04	34·53	27·61	7·86										
		800	2·02	34·62	27·69	7·89										
		1000	1·82	34·67	27·74	7·89										
		1500	1·60	34·70	27·78	7·90										
		2000	1·17	34·70	27·82	7·89										
659	7	0	2·76	33·89	27·04	7·98	—	—	**N 50 V**	100–0	1102					
		10	2·76	33·89	27·04	7·98	—	—	**N 70 V**	50–0						
		20	2·76	33·89	27·04	7·98	—	—	,,	100–50						
		30	2·76	33·89	27·04	7·97	—	—	,,	250–100						
		40	2·74	33·89	27·04	7·97	—	—	,,	500–250	—	1320				
		50	2·39	33·88	27·07	7·96	—	—	**N 70 B**	146–0	1330	1350	KT			
		60	1·38	33·95	27·20	7·93	—	—	**N 100 B**							
		80	0·80	33·97	27·25	7·91										
		100	−0·04	34·02	27·34	7·87										
		150	−0·21	34·14	27·44	7·86										
		200	0·40	34·23	27·48	7·86										
		300	1·91	34·47	27·57	7·83										
		400	1·68	34·46	27·58	7·82										
		600	2·05	34·60	27·67	7·86										
		800	1·93	34·68	27·74	7·87										
		1000	1·77	34·69	27·76	7·87										
		1500	1·35	34·70	27·80	7·88										
660	12	0	1·50	32·30	25·87	—	—	—	**DC**	216	0608	0611				
661	14	0	0·81	33·33	26·81	7·97	105	7·43	**TYFB**	360–0	**0136**	**0226**	DGP	0	6·4	510
		10	−0·80	33·33	26·81	7·97	104	—	**N 70 B**					10	6·4	
		20	0·80	33·33	26·81	7·97	109	7·46	**N 50 V**	100–0	**0330**	**0340**		20	6·1	500
		30	−0·59	33·35	26·82	7·97	106	—	**TYFV**	3000–2000	**0402**	**0418**		30	5·9	
		40	0·34	33·51	26·94	7·97	106	7·45	,,	2000–1500	**0555**	**0605**		40	5·7	490
		50	−0·36	33·51	26·94	7·97	102	—	,,	1000–750	1340	1345		50	5·9	
		60	1·05	34·08	27·43	7·92	125	6·67	,,	750–500	1426	1430		60	7·0	500
		80	−1·16	34·13	27·47	7·91	129	—	,,	500–250	1510	1515		80	8·3	510
		100	−0·99	34·20	27·53	7·91	130	6·20	,,	250–0	1534	1539		100	4·2	530
		150	−0·13	34·40	27·65	7·87	141	—	,,	1500–1000	1623	1632		150	0·0	530
		200	0·35	34·53	27·73	7·84	145	4·89						200	0·0	530
		300	0·83	34·66	27·80	7·85	141							300	0·0	
		400	0·88	34·67	27·81	7·87	141	4·54						400	0·0	530
		600	0·84	34·68	27·82	7·91	140	4·46						600	0·0	
		800	0·55	34·68	27·84	7·92	140	4·51						800	0·0	530
		1000	0·46	34·67	27·84	7·90	140							1000	0·0	
		1500	0·22	34·67	27·85	7·97	136	4·51						1500	0·0	510
		2000	0·00	34·67	27·86	7·97	137							2000	0·0	
		2500	−0·13	34·66	27·86	7·96	140	4·70						2500	0·0	510
		3000	−0·15	34·66	27·86	7·96	142							3000	0·0	
		3200	−0·17	34·66	27·86	7·98	144	4·85						3200	0·0	500
662	15	0	0·18	33·59	26·98	7·97	100	7·49	**TYFB**	460–0	**0503**	**0553**	DGP			
									N 70 B							
663	16	0	0·51	33·60	26·97	7·98	98	7·39	**TYFB**	380–0	**0026**	**0116**	4 iv 31	0	6·4	490
		10	0·52	33·60	26·97	7·98	100	—	**N 70 B**				DGP	10	6·4	
		20	0·52	33·60	26·97	7·98	98	7·36	**TYFV**	1500–1000	0629	0637	5 iv 31	20	6·4	490

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
663 *cont.*	53° 34½′ S, 30° 25¾′ W to 53° 32¼′ S, 30° 20′ W	1931 4 iv	0800	—	W	27	W	5	o.	998·8	1·8	1·4	heavy W swell
			1200	—	WSW	33	WSW	5–6	c. q.	1000·6	1·8	0·8	v. heavy W swell
	53° 30′ S, 30° 10′ W	5 iv	0520	—	SW × W	15	SW × W	3	b. c.	1014·0	1·1	0·2	mod. SW swell
			0800	—	WSW	10	WSW	2	b. c.	1015·2	1·0	0·5	heavy SW swell
			1200	3948*	WNW	18	WNW	3	o.	1015·0	0·3	0·0	,,
			1644	—	NNW	22	NNW	4	o. f.	1012·5	0·8	0·6	heavy conf. swell
664	3 miles S 60° E of Jason I, South Georgia	15 iv	1800	—	W	8	W	2	b.	1014·2	2·6	0·8	slight W swell
665	51° 41½′ S, 29° 58¾′ W	17 iv	0000	3275*	W × S	13	W × S	3	o. m.	1012·9	1·6	1·5	mod. W swell
666	49° 58¾′ S, 29° 52½′ W to 49° 58¾′ S, 30° 13′ W	17–18 iv	1400	4691*	W × N	18	W	2	o. m.	1009·8	3·0	2·5	mod. W swell
			2000	—	W × N	14	W	2	o.	1007·0	3·4	2·3	,,
			0245	—	W	6	W	1–2	o.	998·0	2·6	2·3	,,
			0727	—	E	10	E	2	o. r.	993·3	2·1	1·9	heavy WSW swell
667	48° 09¾′ S, 29° 59½′ W	18 iv	2000	4888*	SW × S	25	SW × S	4	b. c.	982·2	3·9	2·1	mod. conf. swell
668	46° 42½′ S, 30° 22′ W to 46° 43½′ S, 30° 22′ W	19 iv	1300	4903*	SW × W	20	SW × W	4	b. c.	987·0	3·0	1·5	heavy SW swell
			1600	—	SW × W	23	SW × W	4	b. c. q.	987·6	2·9	0·9	,,
			2000	—	SW	28	SW	5	b. c. q.	989·9	1·8	1·0	,,
			2255	—	SW	33	SW	6	b. c.	991·7	3·5	1·4	,,

Penetration of light; St. 663

Hour 1003–1203

Depth (metres)	ccs. of N/10 uranyl oxalate decomposed per hour	Depth (metres)	ccs. of N/10 uranyl oxalate decomposed per hour
Air	2·10	20	0·66
1	1·39	25	0·47
5	1·08	30	—
10	0·85	35	—
15	0·74	40	0·29

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS				Remarks	Depth	Nitrite N_2 mgm./m.^{3}	Nitrate + Nitrite N_2 mgm./m.^{3}
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	Gear	Depth (metres)	TIME From	TIME To				
663 *cont.*	16	30	0·52	33·60	26·97	7·98	102	—	**TYFV**	2000–1500	0814	0823		30	6·4	
		40	0·52	33·60	26·97	7·97	102	7·29	,,	1000–750	1156	1203		40	6·4	490
		50	0·52	33·60	26·97	7·97	102	—	,,	750–500	1246	1251		50	6·5	
		60	0·31	33·70	27·06	7·96	102	7·20	,,	500–250	1326	1330		60	6·5	490
		80	– 0·68	33·96	27·32	7·92	114	—	,,	250–0	1349	1354		80	6·2	490
		100	– 1·02	34·14	27·47	7·91	118	6·40	**N 50 V**	100–0	1634	1645		100	5·8	500
		150	– 0·30	34·34	27·61	7·88	131							150	0·0	510
		200	0·10	34·41	27·64	7·87	131	5·21						200	0·0	530
		300	0·70	34·52	27·70	7·82	139							300	0·0	
		400	0·95	34·62	27·77	7·87	131	4·43						400	0·0	540
		600	1·34	34·68	27·79	7·91	130	4·19						600	0·0	
		800	0·81	34·67	27·81	7·92	139	4·49						800	0·0	540
		1000	0·69	34·67	27·82	7·92	139							1000	0·0	
		1500	0·43	34·67	27·84	7·92	139	4·77						1500	0·0	540
		2000	0·19	34·67	27·85	7·91	130							2000	0·0	
		2500	0·05	34·66	27·85	7·96	139	4·88						2500	0·0	530
		3000	– 0·09	34·66	27·86	7·96	133							3000	0·0	
		3500	– 0·24	34·66	27·87	7·97	135	4·56						3500	0·0	510
664	27	0	1·90	33·71	26·97	—	—	—	**N 50 V**	100–0	1803	1811	+ 2 hours G.M.T.			
665	28	0	2·50	33·80	26·99	7·93	96	7·11	**TYFB** **N 70 B**	250–0	**0028**	**0120**	DGP	0	6·9	460
666	29	0	2·71	33·84	27·01	7·96	105	7·13	**N 50 V**	100–0	1425	1435		0	7·2	470
		10	2·71	33·84	27·01	7·96	109	—	**TYFV**	250–0	1426	1431		10	7·2	
		20	2·69	33·84	27·01	7·96	108	7·12	,,	500–250	1458	1503		20	7·0	480
		30	2·69	33·84	27·01	7·96	109	—	,,	750–500	1642	1647		30	6·6	
		40	2·63	33·84	27·01	7·96	107	7·13	,,	1000–750	1735	1739		40	6·7	480
		50	2·60	33·84	27·02	7·96	106	—	,,	1500–1000	**2030**	**2039**		50	7·1	
		60	2·48	33·84	27·03	7·96	106	7·12	,,	2000–1500	**2229**	**2238**		60	7·1	480
		80	2·36	33·86	27·05	7·95	106	—	,,	3000–2000	0631	0642		80	6·9	
		100	1·86	33·90	27·12	7·94	107	7·06	**TYFB** **N 70 B**	320–0	**0310**	**0400**	DGP	100	7·5	480
		150	– 0·05	34·13	27·43	7·88	126	—						150	0·0	520
		200	0·63	34·24	27·48	7·86	136	5·60						200	0·0	520
		300	1·24	34·40	27·57	7·83	148							300	0·0	
		400	1·76	34·49	27·60	7·84	151	4·22						400	0·0	560
		600	1·99	34·62	27·69	7·84	144	3·90						600		
		800	1·95	34·66	27·73	7·85	139	3·90						800	—	550
		1000	1·94	34·69	27·75	7·86	137	4·02						1000	—	
		1500	1·39	34·74	27·83	7·87	129	4·20						1500	—	550
		2000	1·02	34·73	27·85	7·94	128	4·34						2000		
		2500	0·57	34·70	27·85	7·93	127	4·61						2500	—	530
		3000	0·27	34·69	27·86	7·92	126	4·64						3000		
		3500	0·10	34·68	27·86	7·92	126	4·69						3500	—	520
		4000	– 0·05	34·67	27·86	7·91	126	4·58						4000		
		4500	– 0·25	34·66	27·87	7·93	127	5·06						4500	—	530
667	1	0	6·10	33·89	26·68	8·04	98	6·54	**TYFB** **N 70 B**	320–0	**2036**	**2126**	DGP	0	5·1	
668	1	0	8·59	34·20	26·57	8·08	79	6·20	**TYFV**	250–0	1341	1346		0	5·5	210
		10	8·64	34·20	26·56	8·08	79	—	,,	500–250	1415	1419		10	5·3	
		20	8·66	34·20	26·56	8·08	79	6·08	,,	750–500	1500	1505		20	5·2	210
		30	8·63	34·20	26·57	8·08	79	—	,,	1000–750	1553	1557		30	5·2	
		40	8·61	34·20	26·57	8·08	80	6·17	,,	1500–0	1710	1735		40	4·9	210

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
668 *cont.*	46° 42½′ S, 30° 22′ W to 46° 43½′ S, 30° 22′ W	1931 19 iv											
669	47° 04′ S, 30° 17′ W	21 iv	0708	—	SW × W	35	WSW	7	o. p. q.	1001·5	4·7	3·8	heavy WSW swell
670	44° 52′ S, 30° 17′ W	22 iv	0000	—	W	19	W	3	b. c. q.	1011·1	5·0	2·0	heavy conf. swell
671	43° 08′ S, 30° 15¾′ W	22–23 iv	1300	4561*	S	4	S	2	b. c.	1017·9	11·1	8·3	mod. conf. swell
			1600	—	E	3	—	1	c.	1017·1	9·8	8·2	mod. SW swell
			2000	—	ESE	10	ESE	2	o.	1016·4	9·6	8·1	mod. S swell
			0000	—	E × S	13	E × S	2	o. r.	1015·1	9·3	9·1	mod. SW swell
			0325	—	E	18	E	2	o. m.	1013·4	10·0	9·5	,,
672	40° 25′ S, 30° 06′ W	23 iv	2100	4287*	ESE	8	ESE	2	o.r.	1002·3	15·0	14·8	mod. conf. swell
673	38° 10½′ S, 30° 10¼′ W to 38° 03¾′ S, 29° 48′ W	24–25 iv	1400	4234*	SW × W	20	SW × W	4	c. p.	1006·0	16·7	15·0	mod. SW swell
			1600	—	SW × W	21	SW × W	4	b. c. p.	1007·7	16·1	14·6	mod. conf. swell
			2000	—	SSW	14	SSW	3	b. c.	1012·5	15·0	12·4	,,
			0000	—	WSW	14	WSW	3	b.	1014·8	15·3	12·9	,,
			0437	—	WSW	10	WSW	2–3	b.	1015·4	15·3	13·0	mod. W swell

Station	Age of moon (days)	Hydrological observations: Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Biological observations: Gear	Depth (metres)	Time: From	Time: To	Remarks	Depth	Nitrite N_2 mgm./m.³	Nitrate + Nitrite N_2 mgm./m.³
668 *cont.*	2	50	8·23	34·18	26·61	8·04	80	—	**TYFV**	1500–1000	2047	2056		50	4·8	
		60	8·02	34·18	26·64	8·03	81	6·24	**TYFB**	375–0	2140	2155	DGP	60	4·8	230
		80	6·81	34·28	26·90	7·98	89							80	0·5	240
		100	5·86	34·29	27·03	7·96	94	5·92						100	0·0	250
		150	4·76	34·22	27·10	7·95	102							150	0·0	310
		200	4·02	34·18	27·15	7·93	110	5·94						200	0·0	380
		300	3·40	34·16	27·20	7·93	110							300		
		400	2·86	34·16	27·25	7·92	114	5·90						400	—	450
		600	2·36	34·24	27·36	7·90	119	4·93						600		
		800	2·56	34·35	27·43	7·87	138	4·50						800	—	480
		1000	2·51	34·45	27·51	7·89	141	3·78						1000		
		1500	2·43	34·63	27·66	7·91	134	3·98						1500	—	450
		2000	2·36	34·73	27·75	7·92	122	4·32						2000		
		2500	1·95	34·71	27·76	7·93	124	4·42						2500	—	420
		3000	1·42	34·70	27·80	7·96	126	4·32						3000		
		3500	0·80	34·68	27·82	7·96	132	4·45						3500	—	450
		4000	0·38	34·67	27·84	7·94	137	4·62						4000		
		4500	0·17	34·66	27·84	7·95	138	4·64						4500	—	440
669	3	0	6·60	34·29	26·93	8·05	79	6·27	**TYFV**	2000–1500	0854	0903		0	4·2	
670	4	0	8·10	34·18	26·63	8·09	74	6·21	**TYFB** **N 70 B**	470–0	0018	0108	DGP	0	3·1	
									N 50 V	100–0	0121	0127				
671	4	0	9·70	34·32	26·48	8·09	73	6·11	**TYFV**	250–0	1313	1320		0	3·7	
		10	9·53	34·32	26·51	8·09	73	—	,,	500–250	1340	1345		10	3·7	
		20	9·44	34·32	26·53	8·09	71	6·14	,,	750–500	1427	1431		20	3·5	
		30	9·41	34·32	26·53	8·08	70	—	,,	1000–0	1521	1540		30	3·3	
		40	9·40	34·32	26·54	8·07	69	6·13	,,	1000–750	1732	1737		40	3·2	
		50	9·38	34·32	26·54	8·07	71	—	,,	1500–1000	1843	1853		50	3·2	
		60	9·30	34·32	26·55	8·07	73	6·13	,,	2000–1500	2019	2029		60	3·3	
		80	8·10	34·30	26·73	8·05	80	—	**N 50 V**	100–0	1501	1513		80	3·3	
		100	7·86	34·37	26·82	8·01	87	6·00	**TYFB** **N 70 B**	360–0	0216	0306	DGP	100	3·2	
		150	7·11	34·47	27·00	7·98	99	—						150	0·0	
		200	5·80	34·27	27·02	7·96	108	5·85						200	0·0	
		300	4·08	34·18	27·15	7·93	117									
		400	3·60	34·16	27·18	7·87	125	5·94								
		600	2·78	34·22	27·30	7·90	135	5·50								
		800	2·58	34·34	27·41	7·89	142	4·67								
		1000	2·53	34·41	27·47	7·88	151	4·29								
		1500	2·51	34·63	26·65	7·89	150	3·94								
		2000	2·48	34·77	27·77	7·89	139	4·32								
		2500	2·23	34·80	27·81	7·96	139	4·53								
		3000	1·59	34·77	27·84	7·93	139	4·37								
		3500	0·98	34·72	27·84	7·92	141	4·41								
		4000	0·48	34·70	27·86	7·92	147	4·56								
		4400	0·21	34·69	27·87	7·93	150	4·69								
672	6	0	15·65	34·93	25·78	8·12	9	5·36	**TYFB** **N 70 B**	200–0	2117	2207	DGP	0	1·0	95
673	6	0	17·39	35·16	25·55	8·17	9	5·18	**TYFV**	250–0	1500	1506		0	0·6	60
		10	17·39	35·16	25·55	8·17	9	—	,,	500–250	1810	1815		10	0·0	
		20	17·39	35·16	25·55	8·17	12	5·24	,,	750–500	1901	1906		20	0·0	36
		30	17·39	35·16	25·55	8·17	12	—	,,	1000–750	2119	2124		30	0·0	
		40	17·39	35·16	25·55	8·17	12	5·22	,,	1500–1000	0013	0023		40	0·0	42
		50	17·38	35·17	25·56	8·16	12	—	,,	2000–1500	0222	0231		50	0·0	
		60	17·38	35·17	25·56	8·16	12	5·20	**N 50 V**	100–0	2330	2335		60	0·0	30
		80	17·10	35·24	25·67	8·15	12	—	**TYFB** **N 70 B**	340–0	0331	0422	DGP	80	0·0	42
		100	14·48	35·43	26·43	8·12	25	4·89						100	0·0	89
		150	13·48	35·34	26·57	8·10	30							150	0·0	101

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
673 *cont.*	38° 10½′ S, 30° 10¼′ W to 38° 03¾′ S, 29° 48′ W	1931 24–25 iv											
674	35° 58½′ S, 29° 56′ W	25 iv	2000	4519*	W × N	14	W × N	2	b.	1020·1	15·4	14·6	mod. conf. swell
675	34° 08′ S, 29° 50½′ W	26 iv	0900	2831*	WSW	4	WSW	1	b. c.	1019·0	19·8	17·4	mod. W swell
			1200	—	SW	2	SW	1	b. c.	1018·4	21·3	19·5	,,
			1600	—	NW	9	NW	1	b. c.	1017·4	19·5	17·0	,,
			1905	—	WNW	4	WNW	1	c.	1017·4	18·0	16·4	slight WNW swell
676	33° 43¾′ S, 29° 52¾′ W	26 iv	2200	2757*	WNW	14	WNW	1	b. c.	1017·6	19·0	17·6	slight WNW swell
677	31° 16¼′ S, 29° 56½′ W	27–28 iv	1500	3694*	W × N	8	W × N	1	o.	1015·7	20·5	18·3	slight W swell
			2000	—	NW	5	NW	1	c.	1015·8	21·2	19·8	mod. WSW swell
			0000	—	N × E	5	N × E	1	c.	1015·1	21·2	19·8	,,
			0406	—	N	5	N	1	b.	1013·4	21·0	19·5	,,

Penetration of light; St. 675

Hour 1100–1300

Depth (metres)	ccs. of N 10 uranyl oxalate decomposed per hour	Depth (metres)	ccs. of N 10 uranyl oxalate decomposed per hour
Air	4·87	20	1·37
0	2·31	25	1·16
1	2·21	30	1·08
5	2·19	35	1·05
10	1·72	40	0·80
15	1·54	45	0·33

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks	Depth	Nitrite N_2 mgm./m.^{3}	Nitrate + Nitrite N_2 mgm./m.^{3}
673 *cont.*	6	200	12·56	35·19	26·64	8·07	30	4·95						200	0·0	131
		300	10·76	34·91	26·76	8·05	35							300		
		400	7·88	34·54	26·95	7·99	76	5·14						400	—	260
		600	4·74	34·28	27·15	7·96	91	5·53						600		
		800	3·86	34·28	27·25	7·96	99	5·45						800	—	310
		1000	3·20	34·28	27·31	7·92	139	5·14						1000		
		1500	2·78	34·54	27·56	7·85	147	5·14						1500	—	360
		2000	2·90	34·76	27·72	7·90	139	4·38						2000		
		2500	2·80	34·78	27·75	7·96	132	4·87						2500	—	330
		3000	2·28	34·80	27·81	7·95	136	4·78						3000		
		3500	1·57	34·78	27·85	7·95	140	4·36						3500	—	320
		3750	1·16	34·74	27·85	7·93	156	4·61						3750		
674	8	0	18·10	35·52	25·65	8·17	10	5·13	**TYFB** **N 70 B**	280–0	**2018**	**2109**	DGP	0	0·0	24
675	8	0	19·02	35·44	25·36	8·16	10	5·07	**NH**	0	1400			0	0·0	7
		10	18·92	35·44	25·38	8·16	10	—	**TYFV**	1500–1000	1106	1114		10	0·0	
		20	18·92	35·44	25·38	8·16	10	5·04	,,	2000–1500	1239	1249		20	0·0	6
		30	18·88	35·44	25·39	8·16	10	—	,,	1000–750	1351	1357		30	0·0	
		40	18·86	35·44	25·40	8·16	10	5·09	,,	750–500	1437	1443		40	0·0	7
		50	18·81	35·44	25·41	8·16	11	—	,,	500–250	1549	1553		50	0·0	
		60	18·20	35·45	25·57	8·15	13	5·20	,,	250–0	1612	1617		60	0·0	18
		80	17·01	35·54	25·93	8·12	13	—	,,	2750–2000	**1812**	**1826**		80	0·0	17
		100	16·39	35·54	26·08	8·10	13	5·28	**N 50 V**	100–0	**1812**	**1822**		100	0·0	15
		150	14·84	35·44	26·36	8·08	22							150	0·0	40
		200	13·98	35·37	26·49	8·05	34	4·81						200	0·0	48
		300	13·21	35·31	26·60	8·03	35							300		
		400	12·01	35·13	26·70	8·01	38	4·73						400	—	270
		600	7·63	34·58	27·01	7·97	93	4·70						600		
		800	4·58	34·36	27·23	7·93	102	5·23						800	—	310
		1000	3·60	34·27	27·27	7·90	117	5·07						1000		
		1500	2·81	34·53	27·55	7·90	128	4·19						1500	—	320
		2000	2·83	34·74	27·71	7·89	105	4·46						2000		
		2500	2·86	34·88	27·82	7·91	97	5·06						2500		
		2750	2·83	34·88	27·82	7·93	90	5·14						2750	—	300
676	9	0	19·80	35·60	25·27	8·17	5	5·03	**TYFB** **N 70 B**	290–0	**2216**	**2306**	DGP	0	0·0	6
677	10	0	21·43	35·68	24·90	8·18	8	4·88	**TYFV**	250–0	1513	1518		0	0·0	6
		10	21·43	35·68	24·90	8·18	8	—	,,	500–250	1542	1547		10		
		20	21·42	35·68	24·90	8·18	8	4·90	,,	750–500	1627	1631		20	—	5
		30	21·42	35·68	24·90	8·18	8	—	,,	1000–750	**1821**	**1826**		30		
		40	21·42	35·68	24·90	8·17	8	4·85	,,	1500–1000	**1944**	**1955**		40	—	5
		50	21·42	35·68	24·90	8·17	8	—	,,	2000–0	**2145**	**2215**		50		
		60	20·61	35·65	25·09	8·16	8	5·03			**2351**	**0028**		60	—	6
		80	18·66	35·71	25·65	8·15	10	—	,,	2000–1500*	**0201**	**0211**		80	—	6
		100	17·12	35·55	25·91	8·14	10	5·31	**N 50 V**	100–0	**2020**	**2028**		100	—	6
		150	15·32	35·38	26·20	8·12	14	—	**TYFB** **N 70 B**	420–0	**0305**	**0402**	DGP	150	—	17
		200	14·41	35·34	26·37	8·10	18	5·05						200	—	33
		300	13·61	35·30	26·51	8·07	24							300		
		400	12·45	35·12	26·61	8·04	59	4·85		* ? not fishing properly.				400	—	140
		600	8·83	34·65	26·89	7·96	70	4·67						600		
		800	5·09	34·31	27·13	7·92	114	4·72						800	—	250
		1000	3·76	34·28	27·26	7·88	128	4·95						1000		
		1500	2·90	34·49	27·51	7·87	129	4·21						1500	—	280
		2000	2·80	34·73	27·71	7·87	106	4·48						2000		
		2500	2·82	34·84	27·79	7·92	88	5·02						2500	—	270
		3000	2·78	34·86	27·81	7·93	84	5·21						3000		
		3500	2·43	34·88	27·86	7·93	81	5·20						3500	—	270

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
678	28° 30′ S, 29° 58′ W	1931 28 iv	2200	4402*	N	16	N	2	b. c.	1013·6	23·2	21·8	mod. W swell
679	26° 06½′ S, 30° 06¼′ W	29 iv	1500	5095*	NNW	17	NNW	3	b. c.	1013·7	25·1	22·8	slight NW swell
			2000	—	NNW	14	NNW	2	b. c.	1015·1	24·6	22·8	,,
			2306	—	NNW	15	NNW	2	b. c.	1015·3	24·5	23·0	,,
680	22° 36′ S, 30° 01½′ W	30 iv	2200	5272*	—	2	—	0	b. c.	1016·2	25·2	22·2	slight NE swell
681	21° 13′ S, 29° 55¼′ W	1 v	0800	4956*	NNE	10	NNE	2	b.	1015·0	26·0	20·8	slight E swell
			1200	—	NE × E	10	NE × E	2	b. c.	1015·1	26·2	20·6	,,
			1351	—	NE × E	10	NE × E	2	b. c. v.	1015·1	26·5	23·2	,,
682	20° 11′ S, 29° 57¼′ W	1 v	2200	4861*	E	10	E	2	b. c.	1016·2	28·2	21·2	slight E swell
683	16° 48′ S, 29° 54¾′ W	2 v	2200	4801*	E × N	14	E × N	3	b. c.	1014·6	26·2	21·2	mod. ENE swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks	Depth	Nitrite N_2 mgm./m.^{3}	Nitrate + Nitrite N_2 mgm./m.^{3}
678	11	0	23·15	36·18	24·79	8·20	0	4·72	TYFB N 70 B	360–0	**2014**	**2104**	DGP			
679	11	0	25·24	36·56	24·47	8·25	0	4·60	TYFV	250–0	1526	1531		0	0·0	6
		10	25·24	36·56	24·47	8·25	0	—	,,	500–250	1607	1611		10	0·0	
		20	25·16	36·56	24·49	8·25	0	4·59	,,	750–500	1650	1654		20	0·0	5
		30	25·16	36·56	24·49	8·25	0	—	,,	1000–670	1747	1754		30	0·0	
		40	25·16	36·56	24·49	8·25	0	4·63	,,	1500–1000	**1913**	**1923**		40	0·0	5
		50	24·70	36·50	24·56	8·25	0	—	,,	2000–1500	**2109**	**2119**		50	0·0	
		60	22·48	36·24	25·02	8·23	1	5·20	N 50 V	100–0	**2045**	**2053**		60	0·0	7
		80	21·28	36·20	25·33	8·21	1	—	TYFB	300–0	**2204**	**2254**	DGP	80	0·0	4
		100	20·25	36·07	25·51	8·20	3	5·14	N 70 B					100	0·0	6
		150	17·92	36·07	26·11	8·17	8							150	0·0	6
		200	16·00	35·56	26·18	8·14	14	4·80						200	0·0	22
		300	13·60	35·25	26·47	8·07	32							300		
		400	11·81	35·01	26·64	8·04	52	4·69						400	—	175
		600	8·49	34·61	26·91	7·94	82	4·45						600		
		800	5·04	34·34	27·16	7·86	98	4·64						800	—	240
		1000	3·60	34·39	27·36	7·83	137	4·44						1000		
		1500	2·94	34·70	27·67	7·84	126	4·37						1500	—	280
		2000	3·05	34·86	27·79	7·88	103	5·15						2000		
		2500	2·97	34·94	27·86	7·92	74	5·50						2500	—	180
		3000	2·78	34·93	27·87	7·94	69	5·54						3000		
		3500	2·40	34·90	27·88	7·92	73	5·49						3500	—	240
		4000	1·66	34·82	27·87	7·90	85	5·22						4000		
		4500	1·12	34·79	27·89	7·90	84	5·02						4500	—	260
		5000	0·79	34·72	27·86	7·89	84	4·79						5000	—	270
680	13	0	26·45	36·98	24·40	8·27	0	4·47	TYFB N 70 B	260–0	**2212**	**2302**	DGP			
681	13	0	27·20	37·34	24·43	8·30	0	4·40	TYFV	2000–1500	0914	0923		0	0·0	2
		10	27·20	37·34	24·43	8·30	0	—	,,	1500–1000	1039	1049		10		
		20	27·20	37·34	24·43	8·30	0	4·41	,,	1000–750	1139	1145		20	—	0
		30	27·20	37·34	24·43	8·30	0	—	,,	750–500	1226	1232		30		
		40	27·20	37·34	24·43	8·30	0	4·42	,,	500–250	1306	1310		40	—	0
		50	27·20	37·34	24·43	8·30	0	—	,,	250–0	1326	1331		50		
		60	25·17	36·98	24·49	8·30	3	4·88	N 50 V	100–0	1338	1345		60	—	0
		80	24·23	37·01	25·09	8·29	5							80	—	0
		100	23·60	36·96	25·24	8·27	6	4·77						100	—	1
		150	21·66	36·62	25·54	8·23	8							150	—	1
		200	18·41	36·06	25·98	8·19	10	4·47						200	—	7
		300	14·56	35·40	26·39	8·11	22							300		
		400	11·69	35·00	26·66	7·99	53	4·33						400	—	100
		600	7·25	34·56	27·05	7·87	86	4·03						600		
		800	4·42	34·41	27·29	7·84	109	4·27						800	—	240
		1000	3·40	34·45	27·43	7·83	116	4·12						1000		
		1500	3·20	34·85	27·77	7·85	92	4·61						1500	—	170
		2000	3·29	34·97	27·85	7·91	71	5·07						2000		
		2500	3·02	34·96	27·87	7·92	71	5·50						2500	—	180
		3000	2·84	34·96	27·89	7·94	69	5·43						3000		
		3500	2·66	34·94	27·89	7·92	69	5·43						3500	—	170
		4000	1·90	34·87	27·90	7·92	88	5·28						4000		
		4500	1·13	34·85	27·94	7·92	94	5·06						4500		
		4900	0·42	34·70	27·86	7·91	117	4·69						4900	—	280
682	14	0	27·00	37·38	24·53	8·30	0	4·32	TYFB N 70 B	375–0	**2220**	**2310**	DGP			
683	15	0	26·95	37·43	24·59	8·30	0	4·31	TYFB N 70 B	290–0	**2216**	**2307**	DGP			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
684	15° 37′ S, 29° 53½′ W to 15° 38½′ S, 29° 49½′ W	1931 3 v	0700	4927*	E	20	E	4–5	c.	1013·1	26·0	22·0	mod. E swell
			1200	—	E	15	E	3	b. c.	1014·0	27·0	23·2	,,
			1348	—	NE	15	NE	3	b. c.	1013·7	26·1	21·9	,,
685	14° 28¾′ S, 29° 48¾′ W	3 v	2200	5303*	ENE	14	ENE	3	b. c.	1015·3	25·6	22·3	mod. E swell
686	11° 02½′ S, 29° 51′ W	4 v	2200	5314*	SE–E	19	SE–E	3	o. c.	1013·3	26·5	24·0	mod. SE swell
687	09° 47′ S, 29° 51′ W	5 v	0800	5031*	E	15	E	3	o. p. q.	1012·7	27·2	25·0	mod. E swell
			1200	—	E	14	E	3	o. p. q.	1014·7	23·6	23·1	,,
			1600	—	E	18	E	3	o.	1012·2	25·0	23·9	,,
			1933	—	SE	13	SE	2	b.	1012·9	26·2	24·0	,,
688	09° 26½′ S, 29° 50½′ W	5 v	2200	5400*	E	15–19	E	3	b. c.	1013·8	26·6	24·4	mod. E swell
689	05° 59¾′ S, 29° 49½′ W	6 v	2200	5346*	ESE	19	ESE	3	b. c.	1012·4	26·6	23·7	mod. E swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks	Depth	Nitrite N_2 mgm./m.³	Nitrate + Nitrite N_2 mgm./m.³
684	15	0	26·80	37·24	24·50	8·28	0	4·33	TYFV	2000–1500	0813	0822		0	0·0	2
		10	26·80	37·24	24·50	8·28	0	—	,,	1500–1000	0943	0952		10		
		20	26·80	37·24	24·50	8·28	0	4·34	,,	1000–750	1041	1046		20	—	1
		30	26·80	37·24	24·50	8·28	0	—	,,	750–500	1225	1230		30		
		40	26·80	37·24	24·50	8·28	0	4·30	,,	500–250	1304	1309		40	—	0
		50	26·80	37·24	24·50	8·28	0	—	,,	250–0	1326	1333		50		
		60	26·80	37·24	24·50	8·27	0	4·34	N 50 V	100–0	1336	1345		60	—	0
		80	26·80	37·24	24·50	8·27	0							80	—	0
		100	24·46	37·08	25·07	8·26	2	4·68						100	—	0
		150	22·86	36·89	25·41	8·23	4							150	—	1
		200	19·00	36·14	25·90	8·17	8	4·27						200	—	16
		300	12·64	35·14	26·58	8·04	57							300		
		400	9·66	34·83	26·89	7·93	76	3·44						400	—	220
		600	5·32	34·42	27·19	7·84	115	4·00						600		
		800	3·93	34·42	27·35	7·83	118	4·15						800	—	230
		1000	3·54	—	—	7·82	114	4·09						1000		
		1500	3·81	34·88	27·73	7·87	92	4·66						1500	—	230
		2000	3·16	34·93	27·83	7·90	79	5·19						2000		
		2500	2·82	34·90	27·84	7·92	78	5·12						2500	—	180
		3000	2·71	34·88	27·83	7·94	79	5·11						3000		
		3500	2·53	34·88	27·85	7·93	74	5·27						3500	—	190
		4000	2·06	34·85	27·87	7·93	84	5·18						4000		
		4500	1·21	34·83	27·92	7·93	93	4·81						4500	—	240
		4800	0·82	34·70	27·84	7·90	97	4·73						4800	—	290
685	16	0	26·64	37·30	24·58	8·28	0	4·31	TYFB N 70 B	350–0	2214	2303	DGP			
686	17	0	27·22	36·75	23·99	8·28	0	4·29	TYFB N 70 B	400–0	2215	2305	DGP			
687	17	0	27·51	36·55	23·73	8·28	0	4·28	TYFV	250–0	1310	1315		0	0·0	5
		10	27·58	36·57	23·74	8·28	0	—	,,	500–250	1342	1347		10		
		20	27·58	36·57	23·74	8·28	0	4·29	,,	750–500	1423	1429		20	—	1
		30	27·58	36·57	23·74	8·28	0	—	,,	1000–750	1518	1523		30		
		40	27·58	36·57	23·74	8·28	0	4·26	,,	1500–1000	1636	1652		40	—	1
		50	27·58	36·57	23·74	8·28	0	—	LH	0	1415	1600		50		
		60	27·42	36·69	23·88	8·27	0	4·30	N 50 V	100–0	1845	1855		60	—	1
		80	25·58	36·84	24·58	8·25	0							80	—	1
		100	24·32	36·94	25·01	8·25	3	4·77						100	—	1
		150	19·89	36·33	25·81	8·20	15							150	—	17
		200	13·50	35·35	26·51	7·95	60	3·06						200	—	49
		300	9·21	34·80	26·94	7·82	91							300		
		400	7·31	34·63	27·10	7·79	100	2·70						400	—	260
		600	5·29	34·51	27·27	7·78	130	3·12						600		
		800	4·22	34·49	27·38	7·81	132	3·63						800	—	250
		1000	3·93	34·53	27·44	7·82	144	3·67						1000		
		1500	4·05	34·95	27·76	7·90	77	4·84						1500	—	220
		2000	3·37	34·97	27·85	7·92	72	5·33						2000		
		2500	3·00	34·96	27·87	7·93	67	5·36						2500	—	200
		3000	2·77	34·95	27·89	7·95	74	5·01						3000		
		3500	2·61	34·94	27·89	7·97	63	5·40						3500	—	200
		4000	1·96	34·90	27·92	7·96	74	5·23						4000		
		4500	1·04	34·78	27·89	7·91	84	4·95						4500	—	250
		4900	0·74	34·75	27·88	7·90	91	4·74						4900	—	260
688	18	0	27·68	36·54	23·68	8·28	0	4·30	TYFB N 70 B	450–0	2217	2308	DGP			
689	19	0	28·08	36·35	23·40	8·28	0	4·31	TYFB N 70 B	410–0	2219	2310	DGP			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
690	03° 17¾′ S, 29° 57¾′ W to 03° 20′ S, 30° 03¼′ W	1931 7–8 v	1600	4894*	SE	15	ESE	3	b. c.	1010·0	28·3	25·4	mod. SE swell
			2000	—	SE × E	19	SE × E	3	b.	1011·3	27·2	24·2	mod. ESE swell
			0000	—	SE × E	13	SE × E	3	o. q.	1012·2	27·6	24·6	,,
			0310	—	SE × E	14	SE × E	3	b. c. p.	1010·0	27·2	24·4	,,
691	00° 25¾′ S, 29° 56′ W	8 v	2200	4374*	ESE	15	ESE	3	b.	1012·0	27·0	26·7	mod. SE swell
692	02° 02¼′ N, 30° 08′ W	9 v	2200	3400*	—	2	—	0	b. c.	1012·3	28·0	25·4	mod. E swell
693	02° 59½′ N, 29° 59′ W to 02° 59½′ N, 30° 04¾′ W	10 v	0530	2849*	—	0–2	—	0	o.	1011·1	25·6	24·4	mod. conf. swell
			0800	—	—	0–2	—	0	c.	1012·2	25·8	24·4	,,
			0930	3553*									
			1200	—	—	0–2	—	0	b. c.	1012·0	28·0	25·3	,,
			1403	—	—	0–2	—	0	b. c.	1010·8	27·7	25·0	,,
694	04° 05½′ N, 30° 00′ W	10 v	2130	4126*	—	0–2	—	0	b. c.	1012·2	26·3	23·5	mod. conf. swell
695	07° 28′ N, 30° 00¾′ W	11 v	2200	4281*	NNE	15	NNE	2	b. c.	1011·1	26·5	22·7	mod. E swell
696	08° 54¼′ N, 30° 02¾′ W to 08° 54½′ N, 30° 01′ W	12 v	0900	5419*	ENE	16	ENE	3	b. c.	1012·4	25·6	22·3	mod. NE swell
			1200	—	ENE	15	ENE	3	b. c.	1011·5	25·7	22·6	,,
			1600	—	ENE	15	ENE	3	b. c.	1010·1	25·4	22·2	,,

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	TIME To	Remarks	Depth	Nitrite N_2 mgm./m.³	Nitrate + Nitrite N_2 mgm./m.³
690	20	0	28·20	36·00	23·11	8·28	0	4·34	**TYFV**	250–0	1611	1617		0	0·0	4
		10	28·20	36·01	23·12	8·28	0	—	,,	500–250	1644	1648		10		
		20	28·16	36·02	23·13	8·28	0	4·32	,,	750–500	1724	1729		20	—	3
		30	28·09	36·02	23·15	8·28	3	—	,,	1000–750	**1818**	**1823**		30		
		40	28·08	36·02	23·16	8·28	3	4·32	,,	1500–1000*	**0112**	**0122**		40	—	4
		50	28·08	36·02	23·16	8·28	3	—	**N 70 V**	100–0	**0006**	**0014**		50		
		60	28·05	36·02	23·17	8·28	3	4·35	**TYFB**	460–0	**0211**	**0300**	DGP	60	—	3
		80	22·89	36·00	24·72	8·19	13	—	**N 70 B**					80	—	4
		100	17·61	35·91	26·06	8·04	54	2·98						100	—	43
		150	12·90	35·29	26·65	7·90	81			* ? some admixture from 200–0 m.				150	—	57
		200	12·19	35·17	26·70	7·87	94	2·38						200	—	230
		300	10·88	35·03	26·83	7·85	94							300		
		400	9·37	34·88	26·98	7·84	100	2·63						400	—	250
		600	5·43	34·52	27·26	7·76	128	3·09						600		
		800	4·19	34·52	27·40	7·78	128	3·72						800	—	250
		1000	4·12	34·62	27·49	7·80	128	3·69						1000		
		1500	3·99	34·95	27·77	7·89	78	4·85						1500	—	230
		2000	3·42	34·99	27·85	7·91	71	5·36						2000		
		2500	2·93	34·96	27·88	7·92	67	5·27						2500	—	220
		3000	2·75	34·95	27·89	7·96	58	5·38						3000		
		3500	2·59	34·94	27·89	7·95	66	5·52						3500	—	220
		4000	1·95	34·91	27·92	7·93	82	5·01						4000		
		4500	0·98	34·78	27·89	7·89	91	4·89						4500	—	270
		4800	0·63	34·75	27·89	7·89	96	4·72						4800	—	290
691	21	0	27·40	36·28	23·51	8·28	0	4·37	**TYFB**	400–0	**2214**	**2304**				
									N 70 B							
692	22	0	28·18	36·10	23·19	8·28	0	4·32	**TYFB**	350–0	**2216**	**2308**	DGP			
									N 70 B							
693	22	0	27·91	35·60	22·87	8·29	0	4·37	**TYFV**	1500–1000	0630	0639		0	0·0	2
		10	28·12	35·91	23·06	8·28	0	—	,,	2000–1500	0813	0822		10		
		20	28·12	35·91	23·06	8·28	0	4·34	,,	1000–750	1204	1209		20	—	1
		30	28·12	35·91	23·06	8·28	0	—	,,	750–500	1301	1307		30		
		40	28·12	35·92	23·07	8·28	0	4·39	,,	500–250	1335	1339		40	—	1
		50	28·02	35·93	23·11	8·28	0	—	,,	250–0	1355	1402		50		
		60	27·51	35·98	23·31	8·28	0	4·41	**N 50 V**	100–0	0542	0552		60	—	2
		80	21·50	35·80	24·97	8·11	25							80	—	29
		100	15·58	35·50	26·23	7·96	71	2·34						100	—	63
		150	13·63	35·34	26·53	7·92	78							150	—	170
		200	12·80	35·23	26·62	7·88	85	2·24						200	—	220
		300	11·41	35·17	26·84	7·87	94							300		
		400	9·55	34·88	26·95	7·81	116	2·02						400	—	230
		600	6·04	34·57	27·22	7·76	130	2·83						600		
		800	4·89	34·52	27·33	7·76	130	3·16						800	—	220
		1000	4·64	34·67	27·47	7·84	126	3·39						1000		
		1500	4·08	34·94	27·75	7·93	78	5·10						1500	—	220
		2000	3·48	34·95	27·82	7·92	71	5·50						2000		
		2500	2·99	34·84	27·78	7·92	68	5·37						2500	—	220
		2750	2·87	34·83	27·78	7·92	68	5·40						2750	—	220
694	23	0	28·40	35·82	22·90	8·28	0	4·36	**NH**	0	**2150**					
									TYFB	210–0	**2221**	**2311**	DGP			
									N 70 B							
695	24	0	26·52	36·30	23·87	8·30	0	4·41	**TYFB**	370–0	**2216**	**2306**	DGP			
									N 70 B							
696	24	0	26·08	36·09	23·85	8·30	0	4·47	**TYFV**	2000–1500	1027	1038		0	0·0	2
		10	26·08	36·09	23·85	8·30	0	—	,,	250–0	1425	1430		10		
		20	26·08	36·09	23·85	8·30	0	4·47	,,	500–250	1450	1454		20	—	2

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force (knots)	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
696 *cont.*	08° 54¼′ N, 30° 02¾′ W to 08° 54½′ N, 30° 01′ W	1931 12 v	1935	—	ENE	15	ENE	3	b. c.	1012·7	25·2	22·5	mod. NE swell
697	09° 15¼′ N, 30° 01¾′ W	12 v	2200	4830*	ENE	15	ENE	3	b. c.	1013·7	25·0	22·6	mod. NE swell
698	12° 21¾′ N, 30° 07½′ W	13 v	2200	5830*	NE × N	18	NE × N	4	o.	1016·4	24·3	21·5	mod. NE swell
699	14° 27¼′ N, 30° 02¼′ W	14 v	1400	5373*	NE N	14–18	NE N	3	b. c.	1016·2	23·7	20·7	mod. NE swell
			1600	—	NE	18	NE	3	b. c.	1015·6	23·5	20·7	,,
			2000	—	NE	16	NE	3	b. c.	1017·4	23·3	21·1	,,
			2352	—	NE	16	NE	3	b. c.	1017·3	23·3	20·4	,,
700	20° 21½′ N, 22° 32½′ W	18 v	0810	4148*	NE	17	NE	3	b. c.	1017·3	21·4	18·3	mod. NE swell

Penetration of light; St. 699

Hour 1420–1620

Depth (metres)	ccs. of N/10 uranyl oxalate decomposed per hour	Depth (metres)	ccs. of N/10 uranyl oxalate decomposed per hour
Air	4·44	25	1·33
1	2·97	30	1·08
5	2·70	35	1·04
10	2·09	40	0·88
15	1·67	45	0·73
20	1·53		

Station	Age of moon (days)	Hydrological observations: Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	Biological observations: Gear	Depth (metres)	Time: From	Time: To	Remarks	Depth	Nitrite N_2 mgm./m.^{3}	Nitrate + Nitrite N_2 mgm./m.^{3}
696 *cont.*		30	26.08	36.09	23.85	8.30	0	—	**TYFV**	750–500	1527	1532		30		
		40	26.05	36.09	23.86	8.30	0	4.50	,,	1000–750	1618	1624		40	—	2
		50	26.00	36.08	23.86	8.30	0	—	,,	1500–1000	**1855**	**1905**		50		
		60	25.65	36.03	23.94	8.28	0	4.60	**N 50 V**	100–0	1706	1712		60	—	0
		80	20.20	35.90	25.40	8.11	(10) 24							80	—	27
		100	17.08	35.65	25.99	7.98	(24) 56	2.78						100	—	47
		150	13.05	35.28	26.61	7.91	(32) 74							150	—	200
		200	11.84	35.13	26.73	7.86	(33) 76	2.65						200	—	210
		300	10.02	34.96	26.93	7.83	(37) 85							300		
		400	9.09	34.92	27.06	7.75	(39) 89	1.73						400	—	220
		600	7.43	34.79	27.21	7.73	(59) 136	1.66						600		
		800	5.86	34.69	27.34	7.72	(59) 136	2.18						800	—	250
		1000	5.03	34.75	27.49	7.78	(54) 123	2.92						1000		
		1500	4.10	34.95	27.75	7.90	(39) 90	4.75						1500	—	210
		2000	3.47	34.96	27.83	7.94	(34) 79	5.42						2000		
		2500	3.01	34.95	27.86	7.93	(33) 76	5.45						2500	—	210
		3000	2.72	34.92	27.87	7.93	(34) 77	5.33						3000		
		3500	2.56	34.91	27.87	7.94	(34) 78	5.35						3500	—	210
		4000	2.41	34.89	27.87	7.93	81	4.92						4000		
		4500	2.36	34.88	27.87	7.95	81	5.37						4500	—	210
		5000	2.30	34.88	27.87	7.93	86	5.29						5000		
		5300	2.35	34.88	27.87	7.92	85	5.24						5300	—	210
697	25	0	25.85	36.22	24.02	8.28	0	4.52	**TYFB** **N 70 B**	460–0	**2219**	**2309**	DGP			
698	26	0	25.50	36.33	24.21	8.28	0	4.54	**TYFB**	470–0	**2216**	**2306**	DGP			
699	26	0	23.90	36.34	24.68	8.26	0	4.63	**TYFV**	250–0	1411	1415		0	—	3
		10	23.85	36.33	24.69	8.26	0	—	,,	500–250	1438	1443		10		
		20	23.81	36.33	24.70	8.26	0	4.64	,,	750–500	1519	1523		20	—	1
		30	23.81	36.33	24.70	8.26	0	—	,,	1000–750	1612	1617		30		
		40	23.81	36.33	24.70	8.26	0	4.66	,,	1500–1000	1726	1736		40	—	1
		50	23.81	36.33	24.70	8.26	0	—	,,	2000–1500	**1914**	**1925**		50		
		60	22.33	36.47	25.26	8.25	0	4.80	,,	3000–2000	**2145**	**2204**		60	—	1
		80	21.21	36.62	25.67	8.22	(1) 3	—	**N 50 V**	100–0	1540	1546		80	—	1
		100	18.76	36.51	26.24	8.11	(9) 20	3.36	**TYFB**	370–0	**2249**	**2339**	DGP	100	—	28
		150	14.40	35.67	26.63	7.92	(27) 63							150	—	170
		200	13.00	35.51	26.80	7.90	(35) 80	2.15						200	—	200
		300	11.06	35.20	26.93	7.84	(40) 91							300		
		400	10.00	35.09	27.03	7.82	(44) 100	1.76						400	—	210
		600	7.88	34.90	27.23	7.81	(58) 133	1.86						600		
		800	6.41	34.83	27.38	7.80	(58) 133	2.37						800	—	240
		1000	5.70	34.86	27.50	7.81	(54) 123	2.81						1000		
		1500	4.37	34.97	27.74	7.89	(39) 89	4.43						1500	—	210
		2000	3.52	34.96	27.82	7.92	(34) 79	5.10						2000		
		2500	3.07	34.95	27.86	7.93	(33) 76	5.25						2500	—	210
		3000	2.82	34.93	27.86	7.92	(33) 76	5.29						3000		
		3500	2.58	34.90	27.86	7.93	(34) 78	5.29						3500	—	210
		4000	2.45	34.88	27.86	7.96	(34) 77	5.18						4000		
		4500	2.34	34.88	27.86	7.96	(35) 81	5.13						4500	—	210
		5000	2.31	34.87	27.86	7.96	85	5.25						5000		
		5300	—	34.87	—	7.95	85	5.31						5300	—	210
700	1	0	21.40	36.27	—	—	—	—	**TYFB** **NH**	2025–0 0	0922 0930	1024 1000	DGP + 1 hour G.M.T.			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
WS 434	53° 10′ S, 34° 08′ W	1929 18 v	0405	—	SE	4	SE	4	o. q. r. s.	1004·5	− 0·6	− 0·8	
WS 435	51° 15′ S, 30° 33′ W	19 v	0220	4749 y. M. sm. St.	SSW	3	SSW	3	o.	1013·1	− 0·8	− 1·4	
WS 436	49° 57′ S, 26° 41′ W	20 v	0410	—	SSE	1	—	0	o.	1015·8	0·6	− 0·1	
WS 437	47° 25′ S, 21° 33′ W	21 v	0235	4693	NE	3	NE	2	q. r. s.	1009·8	3·6	2·9	
WS 438	39° 18¼′ S, 1° 59′ E	26 v	1650	1951	W × S	3	W × S	2	c.	1019·3	9·4	8·1	
WS 439	38° 27′ S, 5° 45′ E	27 v	1715	1618	W × N	5	WNW	4	c.	1018·3	10·0	10·0	v. heavy W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
WS 434	10	—	—	—	—	N 70 B	91–0	0424	0444	KT
						N 100 B				
WS 435	11	0	3·26	33·78	26·91	N 50 V	100–0	0425		
		10	3·26	33·78	26·91	N 70 V	50–0			
		20	3·26	33·78	26·91	,,	100–50			
		30	3·27	33·78	26·91	,,	250–100			
		40	3·26	33·78	26·91	,,	500–250			
		50	3·26	33·79	26·92	,,	750–500			
		60	3·26	33·78	26·91	,,	1000–750	—	0622	
		80	3·26	33·78	26·91	N 70 B	157–0	0655	0715	KT
		100	2·74	33·80	26·97	N 100 B				
		150	0·95	34·04	27·30					
		200	1·13	34·20	27·42					
		300	1·94	34·39	27·51					
		400	2·22	34·48	27·56					
		600	2·19	34·55	27·62					
		800	2·17	34·65	27·70					
		1000	2·06	34·70	27·75					
WS 436	12	—	—	—	—	N 70 B	82–0	0422	0442	KT
						N 100 B				
WS 437	13	0	6·59	34·05	26·75	N 50 V	100–0	0240		
		5	6·59	—	—	N 70 V	50–0			
		10	6·59	34·06	26·75	,,	100–50			
		20	6·59	34·06	26·75	,,	250–100			
		30	6·59	34·05	26·74	,,	500–250			
		40	6·59	34·05	26·74	,,	750–500			
		50	6·59	34·06	26·75	,,	1000–660	—	0510	
		60	6·58	34·07	26·76	N 70 B	170–0	0545	0605	KT
		80	6·50	34·06	26·77	N 100 B				
		100	6·46	34·07	26·78					
		150	4·73	34·17	27·07					
		200	4·13	34·16	27·13					
		300	3·59	34·15	27·17					
		400	3·17	34·15	27·21					
		600	2·69	34·16	27·26					
		800	2·63	34·25	27·34					
		1000	2·61	34·39	27·45					
WS 438	17	0	10·99	34·14	26·12	N 70 V	50–0	1700		
		10	10·97	34·15	26·13	,,	100–50			
		20	10·97	34·15	26·13	,,	250–100			
		30	10·90	34·13	26·13	,,	500–280			
		40	10·89	34·13	26·13	,,	750–520			
		50	10·72	34·12	26·16	,,	1000–780	—	2000	
		60	10·67	34·13	26·17	N 70 B	133–0	2024	2044	KT
		80	10·22	34·15	26·27	N 100 B				
		100	9·88	34·28	26·43					
		150	8·93	34·34	26·63					
		200	8·08	34·31	26·74					
		300	7·47	34·36	26·87					
		400	6·55	34·34	26·98					
		600	6·00	34·31	27·03					
		800	4·17	34·20	27·15					
		1000	3·35	34·21	27·24					
WS 439	18	0	12·32	34·26	25·97	N 50 V	100–0	1725		
		10	12·32	34·24	25·95	N 70 V	50–0			
		20	12·32	34·23	25·95	,,	100–55			
		30	12·32	34·23	25·95	,,	250–100			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
WS 439 *cont.*	38° 27′ S, 5° 45′ E	1929 27 v											
WS 440	35° 46′ S, 13° 28′ E	29 v	1717	—	WNW	4	WNW	4	o.	1024·1	15·2	13·9	mod. WNW swell
WS 441	34° 22′ S, 17° 03′ E	30 v	1735	—	WNW	4	WNW	3	o.	1019·0	15·0	15·0	
WS 442	32° 31½′ S, 16° 39′ E	21 vi	1722	—	NNW	2	—	0	o. p.	1018·4	16·8	16·0	very slight SSE swell
WS 443	32° 59½′ S, 17° 26¼′ E	22 vi	1730	—	WNW	2	NW	2	o.	1017·9	17·5	16·7	
WS 444	34° 09¾′ S, 18° 05′ E	23 vi	1745	—	WSW	5	WSW	4	b. c.	1012·0	13·9	13·0	heavy squall at commencement of station with wind ahead of beam
WS 445	34° 57′ S, 18° 46¼′ E	28 vi	1736	—	—	0	—	0	b. z.	1020·4	17·8	16·1	haze shorewards

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 439 *cont.*	18	40	12·32	34·24	25·95	**N 70 V**	500–250			
		50	12·29	34·25	25·97	**N 70 B**	133–0	**2004**	**2024**	KT
		60	12·30	34·24	25·96	**N 100 B**				
		80	12·28	34·24	25·96					
		100	11·33	34·43	26·29					
		150	10·85	34·77	26·64					
		200	9·73	34·58	26·69					
		300	9·12	34·58	26·79					
		400	7·83	34·49	26·92					
		600	6·16	34·34	27·03					
		800	4·31	34·22	27·15					
		1000	3·35	34·20	27·24					
WS 440	20	0	16·66	35·37	25·89	**N 50 V**	100–0	**1721**		
		10	16·69	35·37	25·89	**N 70 V**	50–0			
		20	16·69	35·37	25·89	,,	100–50			
		30	16·68	35·38	25·90	,,	250–100			
		40	16·65	35·38	25·90	,,	500–250			
		50	16·69	35·37	25·89	,,	750–500			
		60	16·69	35·38	25·90	,,	1000–750	—	**2005**	
		80	16·69	35·39	25·91	**N 70 B**	124–0	**2024**	**2044**	KT
		100	16·72	35·38	25·89	**N 100 B**				
		150	14·39	35·18	26·26					
		200	13·88	35·22	26·40					
		300	11·95	35·00	26·62					
		400	10·63	34·87	26·76					
		600	9·06	34·68	26·88					
		800	6·14	34·44	27·11					
		1000	3·85	34·25	27·23					
WS 441	21	0	17·09	35·33	25·76	**N 50 V**	100–0	**1738**		
		10	17·09	35·33	25·76	**N 70 V**	50–0			
		20	17·09	35·33	25·76	,,	100–50			
		30	16·49	35·30	25·88	,,	250–100			
		40	16·37	35·25	25·87	,,	500–250			
		50	16·22	35·26	25·91	,,	750–500			
		60	16·00	35·21	25·92	,,	1000–750	—	**2020**	
		80	13·99	35·08	26·26	**N 100 B**	82–0	**2038**	**2058**	KT
		100	13·64	34·98	26·26	**N 70 B**	144–0	**2124**	**2144**	KT
		150	12·21	34·93	26·51					
		200	11·20	34·83	26·62					
		300	9·10	34·60	26·81					
		400	7·87	34·53	26·94					
		600	5·49	34·37	27·14					
		800	3·54	34·27	27·27					
		1000	3·13	34·37	27·39					
WS 442	14	—	—	—	—	**N 70 B**	159–0	**1730**	**1750**	KT
						N 100 B				
WS 443	15	—	—	—	—	**N 70 B**	106–0	**1737**	**1757**	KT
						N 100 B				
WS 444	16	—	—	—	—	**N 70 B**	173–0	**1750**	**1810**	KT
						N 100 B				
WS 445	21	—	—	—	—	**N 70 B**	90–0	**1740**	**1800**	KT
						N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
WS 446	35° 23′ S, 19° 40′ E	1929 29 vi	1800	—	E	1	—	0	b. c.	1016·9	15·4	15·3	
WS 447	35° 16′ S, 19° 08′ E	30 vi	1730	—	NW	6–7	NW	6	o. q.	1010·1	15·0	14·4	
WS 448	34° 56′ S, 19° 02′ E	17 vii	1740	—	SSE	4	SSE	3	b.	1027·1	15·0	14·2	
WS 449	35° 06¼′ S, 18° 27¼′ E	18 vii	1735	—	SE × S	3	SE × S	1	b. c.	1028·6	17·5	15·6	
WS 450	35° 15′ S, 18° 58′ E	19 vii	1735	—	ESE	3	ESE	2	b. c.	1028·8	15·0	14·2	
WS 451	34° 23½′ S, 18° 03½′ E	20 vii	1730	—	W × N	3	W × N	2	b. c.	1025·5	16·6	15·4	
WS 452	33° 13¼′ S, 17° 38¼′ E	31 vii	1730	—	S × E	2	S	1	b.	1027·3	15·6	14·4	
WS 453	33° 44′ S, 18° 21½′ E	5 viii	1724	51	SSW	2	—	0	b.	1025·4	15·6	14·1	SW swell
WS 454	33° 10¼′ S, 17° 38¼′ E	6 viii	1725	—	SSE	1–3	SSE	1	b.	1021·8	15·8	14·4	
WS 455	34° 09′ S, 18° 05′ E	7 viii	1746	—	E	2	E	1	b. c.	1019·4	18·3	17·9	
WS 456	33° 03¾′ S, 17° 05′ E	4 ix	1815	—	SSE	5	SSE	4	b. c.	1018·2	15·8	15·6	
WS 457	33° 35′ S, 17° 20½′ E	5 ix	1809	—	SE	6	SE	6	b. c.	1017·4	15·0	14·4	
WS 458	33° 10′ S, 17° 34½′ E	6 ix	1820	—	S × E	2	S × E	2	b.	1016·7	15·6	15·0	
WS 459	33° 40½′ S, 16° 55¼′ E	11 ix	1820	—	NE	2	—	0	o.	1017·4	14·4	13·9	heavy SSW swell
WS 460	35° 07½′ S, 17° 46¾′ E	12 ix	1825	—	NW	4	NNW	3	o.	1017·5	15·0	15·0	
WS 461	42° 37′ S, 05° 40′ E	15 x	1914	—	WNW	4	WNW	4	o. m. r.	1017·8	9·4	9·4	
WS 462	44° 07′ S, 01° 43′ E	16–17 x	1850	$\overline{4663}$	—	0	conf.	2	f.	1009·1	7·2	7·2	

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 446	22	—	—	—	—	N 70 B N 100 B	77–0	1808	1828	KT
WS 447	23	—	—	—	—	N 70 B N 100 B	142–0	1738	1758	KT
WS 448	11	—	—	—	—	N 70 B N 100 B	82–0	1745	1805	KT
WS 449	12	—	—	—	—	N 70 B N 100 B	101–0	1742	1802	KT
WS 450	13	—	—	—	—	N 70 B N 100 B	93–0	1739	1759	KT
WS 451	14	—	—	—	—	N 70 B N 100 B	101–0	1737	1757	KT
WS 452	25	—	—	—	—	N 70 B N 100 B	69–0	1736	1758	KT
WS 453	0	—	—	—	—	N 70 B N 100 B	47–0	1726	1735	KT
WS 454	1	—	—	—	—	N 70 B N 100 B	113–0	1731	1751	KT
WS 455	2	—	—	—	—	N 70 B N 100 B	102–0	1750	1810	KT
WS 456	1	—	—	—	—	N 70 B N 100 B	84–0	1821	1841	KT
WS 457	2	—	—	—	—	N 70 B N 100 B	101–0	1816	1837	KT
WS 458	3	—	—	—	—	N 70 B N 100 B	97–0	1831	1853	KT
WS 459	8	—	—	—	—	N 70 B N 100 B	82–0 135–0	1830 1922	1850 1942	KT KT
WS 460	9	—	—	—	—	N 70 B N 100 B	111–0	1832	1852	KT
WS 461	13	—	—	—	—	N 70 B N 100 B	121–0	1917	1937	KT
WS 462	14	0	5·99	—	—	N 70 B N 100 B	126–0	1855	1915	KT
		5	5·99	—	—					
		10	5·99	—	—	N 50 V	100–0	2315		
		20	6·24	—	—	N 70 V	50–0			
		30	6·24	—	—	,,	100–50			
		40	6·24	—	—	,,	250–100			
		50	6·19	—	—	,,	500–250			
		60	6·19	—	—	,,	800–500			
		80	6·19	—	—	,,	1000–750	—	0320	
		100	6·15							
		150	5·99							
		200	5·29							
		300	4·19							
		400	3·59							

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
WS 463	49° 18′ S, 15° 45′ W	1929 21–22 x	2315	838	NW	5	NW	4	o. c. r.	987·6	3·9	3·6	
WS 464	53° 40′ S, 37° 33′ W	31 x	2155	—	NW	5	NW	2	o. m. r.	997·9	3·3	3·1	
WS 465	52° 57′ S, 42° 52′ W	1 xi	2200	—	—	0	—	0	b.	998·3	1·4	1·1	
WS 466	52° 34′ S, 48° 48′ W	2 xi	2200	—	NW	3	WSW	2	b.	1004·9	5·0	5·0	
WS 467	52° 00′ S, 54° 13′ W	3 xi	2215	—	NW	3–4	W	4	b.	999·4	5·6	5·6	
WS 468	55° 52′ S, 56° 53′ W	9–10 xi	1830	4344 gy. y. M. f. y. bl. S.	N	5	N	4	o.	981·6	5·3	4·4	
WS 469	56° 42′ S, 57° 00′ W	10 xi	1400	3959 gy. M. S.	NNW	2	N	4	b. c.	970·8	6·7	6·4	
WS 470	57° 50′ S, 57° 27′ W	11 xi	1405	3572	NW	3	NW	4	b. c.	989·4	5·8	5·2	

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 463	19	0	2·48	—	—	**N 50 V**	100–0	**2325**		
		5	2·30	—	—	**N 70 V**	50–0			
		10	2·35	—	—	,,	100–50			
		20	2·30	—	—	,,	250–100			
		30	2·30	—	—	,,	500–250			
		40	2·30	—	—	,,	750–500			
		50	2·26	—	—	,,	1000–750	—	**0150**	
		60	2·30							
		80	2·30							
WS 464	29	—	—	—	—	**N 70 B** / **N 100 B**	135–0	**2200**	**2220**	KT
WS 465	0	—	—	—	—	**N 70 B** / **N 100 B**	91–0	**2205**	**2225**	KT
WS 466	1	—	—	—	—	**N 70 B** / **N 100 B**	128–0	**2210**	**2230**	KT
WS 467	2	—	—	—	—	**N 70 B** / **N 100 B**	173–0	**2221**	**2242**	KT. Part of catch lost
WS 468	8	0	5·09	34·12	26·99	**N 50 V**	100–0	1835		
		10	5·09	34·12	26·99	**N 70 V**	50–0			
		20	5·04	34·12	26·99	,,	100–50			
		30	5·07	34·13	27·00	,,	250–100			
		40	5·00	34·13	27·01	,,	500–250			
		50	4·96	34·13	27·01	,,	750–500			
		60	4·89	34·13	27·02	,,	1000–750	—	**2230**	
		80	4·77	34·16	27·06	**N 70 B**	193–0	**0055**	**0115**	KT
		100	4·54	34·16	27·08	**N 100 B**				
		150	4·39	34·16	27·10					
		200	4·34	34·17	27·11					
		300	4·19	34·20	27·15					
		400	4·04	34·20	27·17					
		600	3·70	34·19	27·19	—	—	—	—	
		800	3·30	34·23	27·27	—	—	—	—	heavy stray on wire
		1000	3·12	34·25	27·30	—	—	—	—	
		1500	3·02	—	—	—	—	—	—	very heavy stray on wire
		2500	2·42							
WS 469	9	0	3·49	34·10	27·14	**N 50 V**	100–0	1400		
		10	3·44	34·10	27·15	**N 70 V**	50–0			
		20	3·39	34·10	27·15	,,	100–50			
		30	3·38	34·10	27·15	,,	250–100			
		40	3·38	34·10	27·15	,,	500–250			
		50	3·29	34·11	27·17	,,	750–500			
		60	3·18	34·12	27·19	,,	1000–750	—	1710	
		80	3·01	34·11	27·20	**N 70 B**	123–0	**2012**	**2032**	KT
		100	2·77	34·10	27·21	**N 100 B**				
		150	2·54	34·10	27·23					
		200	2·09	34·09	27·26					
		300	2·09	34·12	27·28					
		400	2·18	34·18	27·32					
		600	2·20	34·28	27·40					
		800	2·34	34·48	27·55					
		1000	2·37	34·58	27·63					
		1500	2·49	34·69	27·71					
		2000	2·10	34·71	27·76					
		3000	1·36	34·70	27·80					
WS 470	10	0	1·84	33·94	27·16	**N 50 V**	100–0	1405		

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
WS 470 *cont.*	57° 50′ S, 57° 27′ W	1929 11 xi		f. y. S. sm. bl. St.									
WS 471	58° 53′ S, 57° 54′ W	12 xi	0400	3762 gy. M.	WNW	3	WNW	4	o.	982·4	2·3	2·2	
WS 472	59° 42½′ S, 58° 01′ W	12 xi	1440	3580 y. M.	WNW	2	W	2	b. c.	984·6	5·3	4·4	
WS 473	60° 32½′ S, 58° 21′ W	13 xi	0435	3205	W	4	W	4	b.	990·6	0·6	0·6	

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. C.	S ‰	σt	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
WS 470 *cont.*	10	10	1·81	33·95	27·17	**N 70 V**	50–0			
		20	1·13	33·95	27·21	,,	100–50			
		30	1·10	33·96	27·22	,,	250–100			
		40	1·09	33·95	27·22	,,	500–250			
		50	1·10	33·95	27·22	,,	750–500			
		60	1·10	33·99	27·25	,,	1000–750	—	1630	
		80	1·10	33·99	27·25	**N 70 B**	122–0	1909	1929	KT
		100	0·99	34·00	27·26	**N 100 B**				
		150	0·70	34·01	27·29					
		200	1·09	34·10	27·34					
		300	1·90	34·22	27·38					
		400	2·02	34·34	27·46					
		600	2·12	34·54	27·62					
		800	2·22	34·65	27·69					
		1000	1·51	34·70	27·79					
		2000	1·49	34·72	27·81					
		3000	0·90							
WS 471	11	0	−0·12	33·94	27·28	**N 50 V**	200–0	0400		
		10	−0·15	33·94	27·28	**N 70 V**	100–0			
		20	−0·15	33·94	27·28	,,	200–100			
		30	−0·19	33·94	27·28	,,	500–200			
		40	−0·32	33·95	27·30	,,	1000–480			
		50	−0·50	33·97	27·32	,,	1500–1000			
		60	−0·58	33·97	27·32	,,	2000–1500	—	0750	
		80	−0·66	33·99	27·34	**N 70 B**	110–0	0940	1000	KT
		100	−0·82	34·05	27·40	**N 100 B**				
		125	0·00							
		150	0·92	34·24	27·46					
		200	1·46	34·37	27·53					
		300	1·90	34·51	27·61					
		400	2·00	34·63	27·70					
		600	1·60	34·73	27·81					
		800	1·22	34·73	27·83					
		1500	1·35	34·76	27·85					
		2000	0·91	34·73	27·86					
		3000	0·39	34·72	27·88					
WS 472	11	0	−0·10	33·99	27·32	**N 50 V**	200–0	1515		
		10	−0·22	33·99	27·32	**N 70 V**	100–0			
		20	−0·26	33·99	27·32	,,	200–100			
		30	−0·30	33·99	27·33	,,	500–200			
		40	−0·38	33·99	27·33	,,	1000–500			
		50	−0·42	34·00	27·34	,,	1500–1000			
		60	−0·42	34·00	27·34	,,	2000–1500	—	**2115**	
		80	−0·80	34·05	27·39	**N 70 B**	125–0	**2126**	**2146**	KT
		100	−0·45	34·14	27·45	**N 100 B**				
		125	0·00							
		150	0·84	34·40	27·59					
		200	1·16	34·51	27·66					
		300	1·88	34·63	27·71					
		400	1·91	34·65	27·72					
		600	1·74	34·72	27·79					
		800	1·54	34·72	27·80					
		1000	1·40	34·71	27·81					
		1500	0·95	34·72	27·84					
		2000	0·66	34·71	27·86					
		3000	0·09	34·67	27·86					
WS 473	12	0	−0·49	34·01	27·35	**N 50 V**	200–0	0335		
		10	−0·49	33·99	27·33	**N 70 V**	100–0			
		20	−0·49	34·01	27·35	,,	200–100			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
WS 473 *cont.*	60° 32½′ S, 58° 21′ W	1929 13 xi											
WS 474	61° 03′ S, 56° 42′ W	13 xi	1530	2813 gy. M. d. S.	NW	2	WNW	1	b. c.	997·9	2·8	2·5	
WS 475	61° 48′ S, 55° 51′ W	14 xi	0730	1047 d. gy. M.	NW	6	NW	6	o.	997·1	1·7	1·7	very heavy swell
WS 476	62° 16′ S, 58° 18′ W	14 xi	1825	542 d. gy. M.	NE	3	NE	3	o. q. r.	994·6	1·8	1·8	

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. ° C.	S ‰	σt	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
WS 473 *cont.*	12	30	−0·49	34·01	27·35	**N 70 V**	500–200			
		40	−0·61	34·01	27·36	,,	1500–1000			
		50	−0·69	34·04	27·38	,,	2000–1500			
		60	−0·72	34·04	27·38	,,	1000–500	—	0855	
		80	−0·88	34·05	27·40	**N 70 B**	118–0	0925	0945	KT
		95	−0·84	—	—	**N 100 B**				
		100	0·18	34·18	27·46					
		125	0·60							
		150	1·36	34·34	27·51					
		200	1·88	34·43	27·55					
		300	1·82	34·51	27·61					
		400	1·94	34·59	27·67					
		600	2·01	34·69	27·74					
		800	1·91	34·68	27·75					
		1000	1·86	34·70	27·76					
		1500	1·45	34·72	27·81					
		2000	1·13							
		3000	0·61	34·70	27·85					
WS 474	12	0	−0·50	34·01	27·35	**N 50 V**	200–0	1530		
		10	−0·57	34·01	27·35	**N 70 V**	100–0			
		20	−0·62	34·01	27·36	,,	200–100			
		30	−0·70	34·01	27·36	,,	500–200			
		40	−0·72	34·02	27·37	,,	1000–480			
		50	0·80	34·02	27·37	,,	1500–1000			
		60	0·85	34·04	27·39	,,	2000–1480	—	1900	
		80	−0·92	34·04	27·39	**N 70 B**	100–0	**2301**	**2321**	KT
		100	0·08	34·28	27·54	**N 100 B**				
		150	1·02	34·51	27·67					
		200	1·72	34·60	27·69					
		300	1·80	34·63	27·71					
		400	1·80							
		600	1·71	34·67	27·75					
		800	—	34·73						
		1000	—	34·73						
		1500	0·83	34·71	27·85					
		2000	0·52	34·70	27·86					
		2500	0·37	—	—	—	—	—	—	water bottle touched bottom
WS 475	13	0	−0·80	34·03	27·38	**N 50 V**	200–0	0820		
		10	−0·83	34·03	27·38	**N 70 V**	100–0			
		20	−0·83	34·03	27·38	,,	200–100			
		30	−0·83	34·04	27·39	,,	500–200	—	1000	
		40	−0·83	34·04	27·39					
		50	−0·83	34·05	27·40					
		60	−0·91	34·15	27·48					
		80	−0·80	34·17	27·49					
		100	−0·75							
		150	−0·50	34·33	27·61					
		200	−0·32	34·39	27·65					
		300	−0·29	34·52	27·75					
		400	−0·65	34·56	27·80					
		600	−0·93	34·57	27·82					
		800	−1·19	34·61	27·86					
WS 476	13	0	−0·65	34·05	27·39	**N 50 V**	200–0	1820		
		10	−0·68	34·05	27·39	**N 70 V**	100–0			
		20	−0·72	34·05	27·39	,,	200–100			
		30	−0·60	34·05	27·39	,,	500–200	—	**2035**	
		40	−0·62	34·06	27·40	**N 70 B**	91–0	**2054**	**2115**	KT
		50	−0·70	34·06	27·40	**N 100 B**				
		60	−0·73	34·10	27·43					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
WS 476 *cont.*	62° 16′ S, 58° 18′ W	1929 14 xi											
WS 477	62° 20½′ S, 58° 14′ W	14–15 xi	2150	1892 d. y. M.	ENE	7	NE	6	o. s.	991·3	0·0	0·0	
WS 478	62° 24½′ S, 58° 06½′ W	15 xi	1050	1970	E	4	E	5	o. s.	978·1	0·8	0·8	
WS 479	62° 32½′ S, 57° 55′ W	15–16 xi	2225	1523 y. d. gy. M.	NE	1	N	1	o.	984·6	− 0·6	− 1·1	

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. C.	S ‰	σt	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
WS 476 *cont.*	13	80	−0·71	34·15	27·47					
		100	−0·64	34·18	27·50					
		150	−0·25	34·35	27·61					
		200	−0·25	34·36	27·62					
		250	0·24							
		300	0·52	34·53	27·72					
		400	0·20	34·55	27·75					
		450	0·22	34·58	27·77	—	—	—	—	water bottle touched bottom 2000 hrs.
WS 477	14	0	−0·80	33·97	27·33	**N 50 V**	200–0	**2150**		
		10	−0·80	33·97	27·33	**N 70 V**	100–0			
		20	−0·80	33·97	27·33	,,	200–100			
		30	−0·79	33·99	27·35	,,	500–200			
		40	0·83	33·99	27·35	,,	1000–500			
		50	−0·91	34·00	27·36	,,	1500–1000			
		60	−1·00	34·14	27·48	,,	1200–840	—	**0140**	
		80	−0·95	34·16	27·49	**N 100 B**	140–0	**0210**	**0230**	KT
		100	−0·61	34·32	27·60					
		150	0·12	34·45	27·68					
		200	0·40	34·49	27·69					
		300	0·75	34·61	27·77					
		400	0·20	34·62	27·81					
		600	−0·28							
		800	−1·46	34·61	27·83					
		1000	−1·34	34·60	27·82	—	—	—	—	heavy stray on wire
		1500	−1·58	—	—	—	—	—	—	water bottle touched bottom 0100 hrs.
WS 478	14	0	−0·86	34·02	27·37	**N 70 V**	100–0	1020		
		10	−0·90	34·02	27·38	,,	200–100			
		20	−0·90	34·02	27·38	,,	500–200			
		30	−0·90	34·02	27·38	,,	1000–500			
		40	−0·90	34·02	27·38	,,	1500–960			
		50	−0·90	34·04	27·39	,,	2000–1500			
		60	−0·92	34·05	27·40	**N 50 V**	200–0	—	1518	
		80	−0·94	34·24	27·55	**N 100 B**	146–0	1535	1555	KT
		100	−0·75	34·26	27·56					
		150	−0·05	34·42	27·66					
		200	0·04	34·50	27·72					
		300	0·11	34·59	27·79					
		400	0·20	34·58	27·78					
		600	−1·27	34·56	27·83					
		800	−1·51	34·60	27·86					
		1000	−1·57	34·61	27·87					
		1500	−1·66	34·61	27·88					
WS 479	15	0	−0·90	33·98	27·34	**N 50 V**	200–0	**2228**		
		10	−0·90	33·97	27·34	**N 70 V**	100–0			
		20	−0·90	33·97	27·34	,,	200–100			
		30	−0·91	33·97	27·34	,,	500–200			
		40	−0·92	33·98	27·34	,,	1000–500			
		50	−0·92	34·15	27·48	,,	1500–1000	—	**0210**	
		60	−0·92	34·22	27·54	**N 70 B**	132–0	**0253**	**0313**	KT
		80	−0·89	34·30	27·60	**N 100 B**				
		100	−0·82	34·34	27·63					
		150	−0·60	34·42	27·68					
		200	−0·37	34·50	27·74					
		300	−0·01	34·67	27·86					
		400	−0·85	34·58	27·83					
		600	−1·35	34·61	27·87					
		800	−1·57	34·61	27·88					
		1000	−1·67							
		1250	−1·72	34·62	27·89					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
WS 480	62° 51½′ S, 57° 47½′ W	1929 16 xi	0430	740 gn. M.	NW × N	4	NW × N	4	b. c.	990·5	1·7	1·4	
WS 481	62° 59′ S, 57° 28′ W	16 xi	0910 1019	453 G. sm. St. 403	NE	2	W	2	b. c.	991·4	2·5	2·2	
WS 482	63° 10′ S, 57° 16½′ W	16 xi	1210	152 sm. St.	NNE	3	—	0	f. o.	992·3	1·7	1·4	
WS 483	62° 46¾′ S, 59° 37½′ W	21 xi	0700	1420 gy. gn. M.	E × S	4	E × S	4	b. c.	998·2	0·0	−1·1	
WS 484	62° 54′ S, 59° 28′ W	21 xi	1150	1008 gn. M.	E	4	NE	3	o. c.	999·0	1·1	−0·6	

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 480	15	0	−0·78	34·21	27·52	**N 50 V**	200–0	0430		
		10	−0·80	34·22	27·53	**N 70 V**	1300–940	—	—	Net touched bottom
		20	−0·80	34·25	27·56	,,	1000–500	—	—	,, ,, ,,
		30	−0·80	34·23	27·54	,,	500–200			
		40	−0·80	34·24	27·55	,,	200–100			
		50	−0·85	34·40	27·68	,,	100–0	—	0714	
		60	−0·46	34·58	27·81	**N 70 B**	100–0	0729	0749	KT
		80	−0·13	34·57	27·79	**N 100 B**				
		100	0·10	34·59	27·79					
		150	−0·20	34·61	27·82					
		175	−0·71							
		200	−1·00	34·61	27·86					
		300	−1·09	34·57	27·83					
		400	−1·00	34·59	27·84					
		600	−1·09	34·59	27·85					
WS 481	15	0	−1·18	34·47	27·75	**N 50 V**	200–0	0912		
		10	−1·25	34·50	27·78	**N 70 V**	200–100			
		20	−1·28	34·51	27·78	,,	100–0			
		30	−1·28	34·51	27·78	,,	500–200	—	1000	Net touched bottom
		40	−1·29	34·51	27·78	**N 70 B**	109–0	1046	1108	KT
		50	−1·29	34·50	27·78	**N 100 B**				
		60	−1·29	34·50	27·78					
		80	−1·29	34·50	27·78					
		100	−1·28	34·50	27·78					
		150	−1·25	34·51	27·78					
		200	−1·28	34·50	27·78					
		300	−1·28	34·52	27·79					
		400	−1·25	34·53	27·80					
WS 482	15	0	−1·18	34·51	27·78	**N 70 B**	54–0	1325	1336	KT
		10	−1·30	—	—	**N 100 B**				
		20	−1·36	34·50	27·78					
		30	−1·38	34·51	27·79					
		40	−1·35	34·51	27·79					
		50	−1·35	34·52	27·79					
		60	−1·36	34·52	27·79					
		80	−1·36	34·52	27·79					
		100	−1·38	34·51	27·79					
		125	−1·40	34·52	27·80					
WS 483	20	0	−0·78	34·02	27·37	**N 50 V**	100–0	0705		
		10	−0·79	34·03	27·38	**N 70 V**	50–0			
		20	−0·78	34·03	27·38	,,	100–50			
		30	−0·70	34·09	27·42	,,	250–100			
		40	−0·60	34·12	27·44	,,	500–240			
		50	−0·55	34·14	27·46	,,	750–500			
		60	−0·50	34·16	27·47	,,	1000–750	—	0905	
		80	−0·47	34·17	27·48	**N 70 B**	107–0	1002	1022	KT
		100	−0·40	34·23	27·53	**N 100 B**				
		150	−0·14	34·36	27·62					
		200	−0·30	34·40	27·65					
		300	−0·32	34·52	27·75					
		400	−0·71	34·54	27·80					
		600	−1·01	34·60	27·85					
		800	−1·19	34·58	27·84					
		1000	−1·76	34·61	27·89					
		1300	−1·54	34·61	27·88					
WS 484	20	0	−0·70	34·03	27·37	**N 50 V**	100–0	1155		
		10	−0·71	34·03	27·37	**N 70 V**	50–0			
		20	−0·73	34·03	27·37	,,	100–50			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
WS 484 *cont.*	62° 54′ S, 59° 28′ W	1929 21 xi											
WS 485	63° 02½′ S, 59° 17′ W	21 xi	1630	805 gy. gn. M. f. d. S.	SSE	5	SSE	4	c.	999·4	0·0	−1·7	
WS 486	63° 11½′ S, 59° 13′ W	21 xi	2017	787 gn. M.	SE	4	SE	2	o. c.	1000·6	−2·0	−2·5	
WS 487	63° 17′ S, 59° 20′ W	22 xi	0430	790 gn. M.	SE × E	4	SE × E	4	c. m. s.	1003·9	−0·8	−2·1	

Station	Age of moon (days)	Hydrological observations: Depth (metres)	Temp. ° C.	S ‰	σt	Biological observations: Gear	Depth (metres)	Time: From	Time: To	Remarks
WS 484 *cont.*	20	30	−0·73	34·03	27·37	**N 70 V**	250–100			
		40	−0·73	34·05	27·39	,,	500–250			
		50	−0·50	34·29	27·57	,,	750–500			
		60	−0·39	34·33	27·60	,,	950–740	—	1352	
		80	−0·10	34·39	27·64	**N 70 B**	134–0	1446	1506	KT
		100	−0·02	34·42	27·65	**N 100 B**				
		150	0·25	34·51	27·72					
		200	0·20	34·52	27·73					
		300	0·08	34·59	27·79					
		400	−0·65	34·60	27·83					
		600	−1·16	34·60	27·85					
		800	−1·50	34·62	27·89					
		950	−1·51	34·62	27·89					
WS 485	20	0	−0·70	34·05	27·39	**N 50 V**	100–0	1635		
		10	−0·70	34·06	27·40	**N 70 V**	50–0			
		20	−0·70	34·05	27·39	,,	100–50			
		30	−0·72	34·07	27·41	,,	250–100			
		40	−0·86	34·23	27·54	,,	500–250			
		50	−0·84	34·26	27·56	,,	750–500	—	1755	
		60	−0·84	34·23	27·54	**N 70 B**	164–0	1840	1900	KT
		80	−0·85	34·24	27·55	**N 100 B**				
		100	−0·92	34·33	27·62					
		150	−1·04	34·44	27·72					
		200	−0·90	34·52	27·78					
		300	−1·20	34·52	27·79					
		400	−1·27	34·53	27·80	—	—	—	—	heavy stray on wire
		600	−1·21	34·55	27·82	—	—	—	—	
		750	−1·18	34·54	27·81	—	—	—	—	
WS 486	20	0	−0·70	—	—	**N 50 V**	100–0	2020		
		10	−0·70	34·10	27·43	**N 70 V**	50–0			
		20	−0·70	34·10	27·43	,,	100–50			
		30	−0·70	34·10	27·43	,,	250–100			
		40	−0·70	34·10	27·43	,,	500–250			
		50	−0·75	34·15	27·48	,,	700–500	—	**2135**	
		60	−0·95	34·34	27·64	**N 70 B**	109–0	**2215**	**2235**	KT
		80	−0·95	34·42	27·69	**N 100 B**				
		100	−0·22	34·52	27·75					
		150	−0·43	34·55	27·79					
		200	−0·69	34·56	27·80					
		300	−1·25	34·57	27·83					
		400	−1·24	34·57	27·83	—	—	—	—	heavy stray on wire
		600	−1·17	34·60	27·85	—	—	—	—	
		750	−1·10	34·61	27·87	—	—	—	—	
WS 487	21	0	−0·86	34·28	27·58	**N 50 V**	100–0	0430		
		10	−0·88	34·28	27·58	**N 70 V**	50–0			
		20	−0·89	34·28	27·58	,,	100–50			
		30	−0·89	34·28	27·58	,,	250–100			
		40	−0·89	34·30	27·60	,,	500–250			
		50	−0·90	34·32	27·61	,,	750–500	—	0545	
		60	−1·00	34·38	27·67	**N 70 B**	101–0	0618	0638	KT
		80	−1·36	34·49	27·76	**N 100 B**				
		100	−1·39	34·51	27·78					
		150	−1·33	34·55	27·82					
		200	−1·28	34·57	27·84					
		300	−1·25	34·57	27·84					
		400	−1·25	34·60	27·86					
		600	−1·22	34·60	27·86					
		750	−1·45	34·61	27·88					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
WS 488	63° 51½′ S, 62° 30′ W	1929 22 xi	1650	220 gy. gn. M. G.	ESE	4	conf.	4	b. c.	1004·5	2·1	0·1	
WS 489	63° 38′ S, 62° 32′ W	22 xi	1925	308 gn. M.	ESE	1	—	0	b.	1004·7	0·8	−0·3	
WS 490	63° 24½′ S, 62° 35½′ W	22–23 xi	2255	262 S. gy. gn. M. G.	ESE	1	—	0	b.	1004·2	−1·1	−2·0	
WS 491	63° 12′ S, 62° 26′ W	23 xi	0240	170 ? R	SW	2	—	0	b. c.	1003·9	−0·8	−2·0	
WS 492	62° 50½′ S, 61° 53′ W	23 xi	0630	526 ? M	SSW	3	SSW	2	b.	1002·6	2·2	0·0	

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 488	21	0	−1·04	33·86	27·24	**N 50 V**	100–0	1655		
		10	1·08	33·86	27·24	**N 70 V**	50–0			
		20	−1·10	33·86	27·24	,,	100–50			
		30	−1·14	33·86	27·24	,,	200–100	—	1730	
		40	−1·18	33·87	27·27	**N 70 B**	107–0	1755	1815	KT
		50	−1·18	33·86	27·25	**N 100 B**				
		60	−1·20	33·92	27·30					
		80	−0·81	34·13	27·45					
		100	−0·22	34·39	27·64					
		150	0·40	34·53	27·73					
		200	0·97	34·68	27·81					
WS 489	21	0	0·82	33·98	27·34	**N 50 V**	100–0	1927		
		10	−0·85	33·97	27·33	**N 70 V**	50–0			
		20	−0·88	33·97	27·34	,,	100–50			
		30	−0·92	33·97	27·34	,,	280–100	—	2000	
		40	−0·92	33·99	27·35	**N 70 B**	97–0	2125	2145	KT
		50	−1·05	33·99	27·36	**N 100 B**				
		60	−1·08	34·05	27·40					
		80	−0·96	34·12	27·45					
		100	−0·80	34·17	27·49	—	—	—	—	temperature at 125 metres −0·87
		150	−0·07	34·39	27·64					
		200	0·48	34·56	27·74					
		290	0·88	34·62	27·77					
WS 490	21	0	−0·65	34·02	27·37	**N 50 V**	100–0	2300		
		10	−0·55	34·03	27·37	**N 70 V**	50–0			
		20	−0·50	34·12	27·44	,,	100–50			
		30	−0·58	34·15	27·47	,,	250–100	—	2337	
		40	−0·52	34·15	27·47	**N 70 B**	98–0	0010	0030	KT
		50	−0·51	34·18	27·49	**N 100 B**				
		60	−0·51	34·19	27·50					
		80	−0·50	34·19	27·50					
		100	−0·40	34·23	27·53					
		150	−0·12	34·36	27·61					
		200	0·24	34·43	27·66					
		250	0·55	34·57	27·75					
WS 491	22	0	−0·67	34·06	27·40	**N 50 V**	100–0	0245		
		10	−0·65	34·06	27·40	**N 70 V**	50–0			
		20	−0·70	34·07	27·41	,,	100–50			
		30	−0·74	34·07	27·41	,,	160–100	—	0312	
		40	−0·74	34·05	27·39	**N 70 B**	96–0	0334	0354	KT
		50	−0·74	34·08	27·41	**N 100 B**				
		60	−0·74	34·12	27·44					
		80	−0·70	34·20	27·51					
		100	−0·60	34·22	27·51					
		150	−0·05	34·42	27·65					
WS 492	22	0	−0·65	33·94	27·30	**N 50 V**	100–0	0635		
		10	−0·70	33·96	27·32	**N 70 V**	50–0			
		20	−0·72	33·94	27·30	,,	100–50			
		30	−0·72	33·95	27·31	,,	250–100			
		40	−0·80	34·03	27·38	,,	500–250	—	0727	
		50	−0·84	34·00	27·35	**N 70 B**	87–0	0830	0850	KT
		60	−0·90	34·01	27·37	**N 100 B**				
		80	−1·02	34·06	27·41					
		100	−1·05	34·13	27·46					
		150	−0·98	34·18	27·51					
		200	−0·83	34·29	27·58	—	—	—	—	temperature at 250 metres −0·43
		300	0·25	34·45	27·67	—	—	—	—	temperature at 350 metres 0·49
		400	1·07	34·61	27·76					
		500	0·96	34·67	27·80					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. ° C. Dry bulb	Air Temp. ° C. Wet bulb	Remarks
WS 493	62° 51′ S, 60° 34′ W	1929 23 xi	1335	220 d. M. c. S.	SW	5	SW	2	b. c.	997·2	2·0	0·3	
WS 494	A. 63° 15′ S, 61° 05′ W	28 xi	0803	1035 gy. M. d. S. sm. St.	NE	1–2	—	0	c.	993·4	1·1	– 0·6	
	B. 63° 37½′ S, 61° 16′ W	,,	1145	505 G. S. M.	NNE	1	—	0	b.	994·2	3·4	3·3	
WS 495	67° 47′ S, 73° 51′ W	22 xii	0000	2582 y. M.	SSE	3	—	0	o.	1000·6	– 2·2	– 2·5	in pack ice. NNW swell
WS 496	67° 14′ S, 70° 12′ W	30 xii	0940	631 gy. gn. M.	S	1–2	—	0	b. c.	992·4	2·5	1·4	N swell
WS 497	67° 05′ S, 70° 40′ W	1930 1 i	1316	534 gy. gn. M.	—	0	—	0	c. o.	997·0	2·8	1·7	N swell
WS 498	66° 21′ S, 69° 01′ W	2–3 i	2315	398 gy. M. sm. St.	ESE	2	ESE	1	c.	995·6	0·0	– 0·6	W swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
WS 493	22	0	–0·50	34·07	27·40	**N 50 V**	100–0	1337		
		10	–0·50	34·07	27·40	**N 70 V**	50–0			
		20	–0·52	34·07	27·40	,,	100–50			
		30	–0·61	34·16	27·47	,,	200–100	—	1409	
		40	–0·60	34·14	27·46	**N 70 B**	104–0	1440	1500	KT
		50	–0·60	34·14	27·46	**N 100 B**				
		60	–0·49	34·17	27·48					
		80	–0·43	34·19	27·49					
		100	–0·39	34·22	27·51					
		150	–0·15	34·36	27·62					
		200	0·19	34·50	27·71					
WS 494	27									
WS 495	21	0	–1·25	33·51	26·98	**N 50 V**	100–0	0000		
		10	–1·22	33·66	27·09	**N 70 V**	50–0			
		20	–1·52	33·77	27·19	,,	100–50			
		30	–1·72	33·91	27·31	,,	250–100			
		40	–1·78	33·95	27·34	,,	500–250			
		50	–1·80	33·99	27·38	,,	750–500			
		60	–1·81	34·02	27·40	,,	1000–750	—	0420	
		80	–1·81	34·05	27·43					
		100	–1·80	34·07	27·44					
		150	–1·12	34·23	27·55					
		200	–0·34	34·39	27·65					
		300	0·52	34·61	27·78					
		400	1·10	34·68	27·80					
		600	1·22	34·70	27·81					
		800	1·11	34·70	27·82					
		1000	0·95	34·71	27·84					
WS 496	29	0	0·63	32·98	26·47	**N 50 V**	100–0	0950		
		10	–0·02	33·19	26·67	**N 70 V**	50–0			
		20	0·40	33·53	26·96	,,	100–50			
		30	–1·13	33·69	27·12	,,	250–100			
		40	–1·42	33·77	27·19	,,	600–250	—	1125	
		50	–1·57	33·82	27·24	**N 70 B**	106–0	1249	1309	KT
		60	1·66	33·90	27·30	**N 100 B**				
		80	–1·80	33·98	27·37					
		100	–1·82	34·00	27·39					
		150	–1·58	34·06	27·43					
		200	–0·32	34·35	27·62					
		300	0·51	34·55	27·74					
		400	1·00	34·64	27·78					
		500	1·16	34·68	27·80					
		600	0·99	34·70	27·83					
WS 497	2	—	—	—	—	**N 70 B**	97–0	1344	1404	KT
						N 100 B				
WS 498	3	0	1·10	33·36	26·74	**N 70 V**	50–0	2325		
		10	1·05	33·45	26·82	,,	100–50			
		20	0·80	33·60	26·95	,,	250–100	—	—	temperature at 25 metres –0·83
		30	–0·98	33·81	27·21	,,	370–250			
		40	–1·55	33·96	27·35	**N 50 V**	100–0	—	0030	
		50	–1·68	33·96	27·35	**N 70 B**	101–0	0132	0152	KT
		60	–1·76	33·97	27·36	**N 100 B**				
		80	–1·80	34·03	27·41					
		100	–1·80	34·04	27·42	—	—	—	—	temperature at 125 metres –0·38

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
WS 498 *cont.*	66° 21′ S, 69° 01′ W	1930 2–3 i											
WS 499	65° 45′ S, 67° 18′ W	3 i	0800	179 gy. M. S.	SE	4	SE	4	o.	994·6	0·6	0·0	
WS 500	65° $11\frac{3}{4}$′ S, 65° 49′ W	3 i	1520	165 R.	S × W	4	S × W	3	b.	996·0	2·2	1·4	
WS 501	64° 52′ S, 63° 58′ W	3 i	2120	583 gn. M. d. gy. S. sm. St.	—	0	—	0	b. c.	997·7	− 0·3	− 1·1	
WS 502	69° 43′ S, 99° 38′ W	30 i	0530	4224 y. M.	—	0	—	0	o. s.	982·9	− 1·7	− 2·2	

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 498 *cont.*	3	150	−0·34	34·36	27·63					
		200	0·20	34·53	27·74					
		300	0·98	34·65	27·79					
		350	1·32	34·72	27·82					
WS 499	3	0	1·40	33·81	27·08	**N 50 V**	100–0	0810		
		10	0·90	33·81	27·12	**N 70 V**	50–0			
		20	−0·09	33·84	27·19	,,	100–50			
		30	−0·85	33·89	27·27	,,	150–100	—	0840	
		40	−1·11	33·91	27·29	**N 70 B**	76–0	0903	0925	KT
		50	−1·44	33·94	27·33	**N 100 B**				
		60	−1·63	33·96	27·35					
		80	−1·71	34·04	27·42					
		100	−1·64	34·07	27·44					
		125	−0·82							
		150	−0·36	34·31	27·59					
WS 500	4	0	1·30	33·65	26·96	**N 50 V**	100–0	1525		
		10	1·28	33·65	26·96	**N 70 V**	50–0			
		20	0·82	33·73	27·06	,,	100–50			
		30	−0·15	33·79	27·16	,,	150–100	—	1600	
		40	−0·42	33·87	27·23	**N 70 B**	101–0	1610	1630	KT
		50	−0·59	33·87	27·24	**N 100 B**				
		60	−0·70	33·93	27·29					
		80	−0·72	33·98	27·34					
		100	−0·72	34·29	27·58					
		150	−0·18	34·39	27·64					
WS 501	4	0	2·12	33·21	26·55	**N 50 V**	100–0	2125		
		10	0·85	33·48	26·85	**N 70 V**	50–0			
		20	−0·41	33·61	27·02	,,	250–100			
		30	−0·63	33·74	27·14	,,	100–50			
		40	−0·82	33·83	27·22	,,	550–250	—	2220	
		50	−0·85	33·93	27·30	**N 70 B**	109–0	2248	2308	KT
		60	−0·78	33·94	27·30	**N 100 B**				
		80	−0·34	34·13	27·43					
		100	−0·04	34·26	27·53					
		150	0·46	34·43	27·64					
		200	0·68	34·53	27·71					
		300	0·90	34·61	27·76					
		400	0·95	34·64	27·78					
		500	1·04	34·63	27·77					
WS 502	0	0	−0·60	33·12	26·63	**N 50 V**	100–0	0540		
		10	−0·12	33·44	26·87	**N 70 V**	50–0			
		20	−0·37	33·57	26·99	,,	100–50			
		30	−0·98	33·83	27·22	,,	250–100			
		40	−1·60	34·10	27·46	,,	500–250			
		50	−1·65	34·12	27·48	,,	1000–750			
		60	−1·70	34·15	27·51	,,	750–500	—	0735	
		80	−1·70	34·18	27·53	**N 70 B**	92–0	1308	1328	KT
		100	−1·70	34·20	27·55	**N 100 B**				
		150	−0·68	34·31	27·60					
		175	0·76							
		200	1·49	34·58	27·70					
		300	1·80	34·68	27·75					
		400	1·80	34·69	27·76					
		600	1·77	34·72	27·79					
		800	1·63	34·76	27·83					
		1000	1·50	34·76	27·84					
		1500	1·12	34·72	27·83					
		2000	0·87	34·70	27·83					
		3000	0·46	34·68	27·84					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force	Direction	Force			Dry bulb	Wet bulb	
WS 503	70° 03½′ S, 100° 39′ W	1930 30 i	1840	4072 y. M.	WNW	2	—	0	o. s.	979·5	−1·7	−2·8	
WS 504	69° 36′ S, 94° 14′ W	2 ii	1415	3832	NE	3	—	0	o. c.	—	0·6	0·0	NNE swell
WS 505	70° 10½′ S, 87° 46′ W	4 ii	1115	1500 y. M. d. c. S.	SE	4–2	—	—	b.	992·3	−0·6	−0·7	confused swell
WS 506	70° 31′ S, 81° 36′ W	7 ii	1645	584 y. M.	N	1	—	0	o. s.	981·4	−0·4	−0·4	confused NW and N swell
WS 507	A, 70° 32½′ S, 81° 42′ W	8 ii	0940	572 y. M.	—	0	—	0	o.	982·3	−0·6	−0·6	heavy NW swell
	B, 70° 34′ S, 81° 55′ W		1910	580 y. M. sm. St.	SE × S	2	—	1	c. s. q.	980·2	−1·7	−1·7	

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 503		—	—	—	—	**N 70 B**	73–0	1954	2014	KT
						N 100 B				
WS 504	4	0	−0·51	33·18	26·68	**N 50 V**	100–0	1423		
		10	−0·53	33·20	26·70	**N 70 V**	50–0			
		20	−1·12	33·35	26·84	,,	100–50			
		30	−1·40	33·58	27·04	,,	250–100			
		40	−1·62	33·92	27·32	,,	500–240			
		50	−1·67	34·14	27·50	,,	750–500			
		60	−1·69	34·16	27·51	,,	1000–750	—	1630	
		80	−1·69	34·19	27·54	**N 70 B**	109–0	1847	1907	KT
		100	−1·50	34·22	27·55	**N 100 B**				
		125	−0·71							
		150	0·38	34·44	27·65					
		200	1·42	34·57	27·69					
		300	1·69	34·63	27·72					
		400	1·72	34·68	27·76					
		600	1·81	34·70	27·77					
		800	1·54	34·70	27·79					
		1000	1·38	34·70	27·80					
		1500	1·04	34·71	27·83					
		2000	0·81	34·69	27·83					
		3000	0·40	34·68	27·85					
WS 505	6	0	−1·12	33·10	26·64	**N 50 V**	100–0	1118		
		10	−1·54	33·23	26·75	**N 70 V**	50–0			
		20	−1·70	33·59	27·05	,,	100–50			
		30	−1·70	33·74	27·17	,,	250–100			
		40	−1·71	34·06	27·43	,,	500–250			
		50	−1·75	34·14	27·50	,,	750–500			
		60	−1·76	34·15	27·51	,,	1000–750	—	1308	
		80	−1·78	34·17	27·52	**N 70 B**	84–0	1414	1434	KT
		100	−1·80	34·17	27·53	**N 100 B**				
		150	−1·54	34·24	27·57					
		200	−1·22	34·35	27·65					
		300	−0·10	34·52	27·74					
		400	0·76	34·61	27·77					
		600	1·14	34·66	27·79					
		800	1·09	34·70	27·82					
		1000	0·96							
		1450	0·68	34·67	27·82					
WS 506	9	0	−1·70	33·51	26·99	**N 50 V**	100–0	1455		
		10	−1·71	33·53	27·00	**N 70 V**	50–0			
		20	−1·80	33·54	27·01	,,	100–50			
		30	−1·80	33·55	27·02	,,	250–100			
		40	−1·80	33·56	27·03	,,	550–250	—	1615	
		50	−1·80	33·84	27·26					
		60	−1·80	33·86	27·27					
		80	−1·80	33·90	27·30					
		100	−1·80	33·96	27·35					
		150	−1·70	34·02	27·40					
		200	−1·68	34·23	27·55					
		300	−0·60	34·43	27·69					
		400	0·20	34·58	27·78					
		500	0·77	34·64	27·79					
WS 507	9									

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Air Temp. C. Wet bulb	Remarks
WS 508	69° 04′ S, 77° 40′ W	1930 10 ii	0040	309 G.	E	1	—	—	o. s. q.	975·5	0·0	−0·3	heavy NE × E swell
WS 509	67° 18′ S, 69° 28′ W	11 ii	0255	445 gn. y. M.	W	1	—	0	o. c.	986·8	0·0	−1·1	mod. W × N swell
WS 510	67° 11′ S, 69° 46′ W	11 ii	0610	505 gn. y. M.	ENE	3	ENE	2	o.	986·9	0·6	0·0	heavy WNW swell
WS 511	67° 04′ S, 70° 04′ W	11 ii	0915	635 gn. y. M.	NE	5	N × E	5	o. s. q.	985·3	2·2	2·0	
WS 512	66° 57′ S, 70° 22′ W	11 ii	1235	652 gn. y. M.	N E	5	N E	5	o. s. q.	985·3	2·2	2·0	heavy WNW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 508	11	0	0·10	33·49	26·91	**N 50 V**	100–0	0040		
		10	0·10	33·49	26·91	**N 70 V**	50–0			
		20	0·10	33·49	26·91	,,	100–50			
		30	−0·10	33·53	26·94	,,	250–100	—	0127	
		40	−0·15	33·58	26·99	**N 70 B**	91–0	0204	0224	KT
		50	−1·00	33·77	27·18	**N 100 B**				
		60	−1·70	33·93	27·33					
		80	−1·74	33·96	27·35					
		100	−1·75	34·05	27·42					
		150	−1·80	34·10	27·47					
		200	−0·79	34·26	27·56					
		300	0·30	34·52	27·72					
WS 509	12	0	0·76	33·60	26·95	**N 50 V**	100–0	0255		
		10	0·70	33·59	26·95	**N 70 V**	50–0			
		20	0·70	33·59	26·95	,,	100–50			
		30	0·70	33·61	26·97	,,	250–100			
		40	0·32	33·72	27·08	,,	420–250	—	0350	N 70 V. Touched bottom
		50	−0·40	33·73	27·12	**N 70 B**	120–0	0431	0451	KT
		60	−0·80	33·75	27·15	**N 100 B**				
		80	−1·69	33·90	27·30					
		100	−1·75	33·94	27·34					
		150	−1·82	33·97	27·36	—	—	—	—	temperature at 175 metres −1·70
		200	−0·90	34·19	27·51	—	—	—	—	temperature at 250 metres 0·18
		300	0·72	34·58	27·75					
		400	0·96	—	—	—	—	—	—	water bottle touched bottom
WS 510	12	0	0·94	33·06	26·51	**N 50 V**	100–0	0610		
		10	0·94	33·05	26·50	**N 70 V**	50–0			
		20	0·92	33·07	26·52	,,	100–50			
		30	0·87	33·09	26·54	,,	250–100			
		40	0·77	33·16	26·60	,,	480–250	—	0705	
		50	0·64	33·31	26·73	**N 70 B**	110–0	0746	0806	KT
		60	0·40	33·54	26·93	**N 100 B**				
		80	−1·40	33·78	27·20					
		100	−1·70	33·87	27·28					
		150	−1·81	33·97	27·36					
		200	−1·82	34·03	27·41					
		250	0·72							
		300	0·46	34·52	27·71					
		400	0·99	34·65	27·78					
WS 511	13	0	0·70	33·00	26·48	**N 50 V**	100–0	0920		
		10	0·73	33·00	26·48	**N 70 V**	50–0			
		20	0·80	33·05	26·51	,,	100–50			
		30	0·60	33·30	26·72	,,	250–100			
		40	0·36	33·57	26·96	,,	575–250	—	1020	
		50	0·58	33·65	27·01	**N 70 B**	98–0	1100	1120	KT
		60	−0·50	33·69	27·09	**N 100 B**				
		70	−1·40							
		80	−1·60	33·85	27·26					
		100	−1·67	33·93	27·33					
		150	−1·80	34·02	27·40					
		200	−0·60	34·26	27·56	—	—	—	—	moderately heavy stray on wire
		300	0·41	34·54	27·73	—	—	—	—	
		400	0·82	34·61	27·76	—	—	—	—	
		600	1·10	34·70	27·82	—	—	—	—	
WS 512	13	0	0·93	33·69	27·02	**N 50 V**	100–0	1235		
		10	0·92	33·69	27·02	**N 70 V**	50–0			
		20	0·92	33·69	27·02	,,	100–50			
		30	0·90	33·69	27·02	,,	250–100			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
WS 512 *cont.*	66° 57′ S, 70° 22′ W	1930 11 ii											
WS 513	66° 49½′ S, 70° 40½′ W	11 ii	1600	560 gn. y. M. d. S.	NNE	5	NNE	4	o. s. q.	982·9	2·5	2·5	confused N swell
WS 514	66° 40½′ S, 71° 01′ W	11 ii	1935	531 gn. y. M. f. d. c. S.	NNE	4	NNE	4	o.	982·9	1·7	1·7	
WS 515	66° 32½′ S, 71° 20½′ W	11–12 ii	2300	512 gn. y. M. f. d. S.	N × W	5	N × W	3	b. c.	983·3	2·2	1·7	heavy N swell
WS 516	66° 25½′ S, 71° 38½′ W	12 ii	0240	2611 y. M. bl. c. S.	N	1	—	0	o. c.	983·5	2·2	2·2	mod. NW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 512 *cont.*	13	40	0·90	33·70	27·03	**N 70 V**	550–250	—	1332	
		50	0·88	33·71	27·04	**N 70 B**	128–0	1415	1435	KT
		55	−0·12	—	—	**N 100 B**				
		60	−1·40	33·93	27·32					
		80	−1·73	33·99	27·37					
		100	−1·80	34·02	27·40					
		150	−0·89	34·22	27·54	—	—	—	—	
		200	−0·14	34·40	27·65	—	—	—	—	
		300	0·76	34·63	27·79	—	—	—	—	moderately heavy stray on wire
		400	1·02	34·66	27·79	—	—	—	—	
		600	1·11	34·72	27·84	—	—	—	—	
WS 513	13	0	0·90	33·70	27·03	**N 50 V**	100–0	1610		
		10	0·90	33·69	27·02	**N 70 V**	50–0			
		20	0·89	33·73	27·05	,,	100–50			
		30	0·88	33·73	27·05	,,	250–100			
		40	0·82	33·73	27·06	,,	500–250	—	1740	
		50	0·51	33·73	27·08	**N 70 B**	117–0	1745	1805	KT
		60	−1·49	33·87	27·27	**N 100 B**				
		80	−1·73	34·00	27·39					
		100	−1·79	34·01	27·40					
		150	−1·15	34·16	27·50					
		200	−0·18	34·43	27·68	—	—	—	—	
		300	0·72	34·61	27·77	—	—	—	—	moderately heavy stray on wire
		400	0·76	34·65	27·81	—	—	—	—	
		500	0·99	34·67	27·81	—	—	—	—	
WS 514	13	0	0·80	33·69	27·03	**N 50 V**	100–0	1934		
		10	0·80	33·69	27·03	**N 70 V**	50–0			
		20	0·80	—	—	,,	100–50			
		30	0·78	33·71	27·04	,,	250–100			
		40	0·72	33·70	27·04	,,	500–250	—	2042	
		45	0·46	—	—	**N 70 B**	126–0	**2112**	**2132**	KT
		50	−1·02	33·89	27·28	**N 100 B**				
		60	−1·68	33·96	27·35					
		80	−1·79	34·02	27·40					
		100	−1·80	34·04	27·42					
		125	−1·60							
		150	−0·60	34·26	27·56					
		200	0·05	34·52	27·74					
		300	0·90	34·62	27·77					
		400	0·90	34·65	27·79					
WS 515	13	0	1·55	33·68	26·97	**N 50 V**	100–0	**2305**		
		10	1·55	33·68	26·97	**N 70 V**	50–0			
		20	1·55	33·69	26·97	,,	100–50			
		30	1·55	33·68	26·97	,,	250–100			
		40	1·55	33·68	26·97	,,	500–250	—	**0000**	
		50	1·30	33·69	27·00	**N 70 B**	105–0	**0049**	**0109**	KT
		55	−0·90	—	—	**N 100 B**				
		60	−1·33	33·91	27·30					
		80	−1·72	33·96	27·35					
		100	−1·74	34·01	27·39					
		150	−1·06	34·14	27·48					
		200	0·00	34·50	27·72					
		300	0·86	34·60	27·76					
		400	0·90	34·63	27·78					
WS 516	13	0	1·70	33·69	26·97	**N 50 V**	100–0	**0240**		
		10	1·70	33·69	26·97	**N 70 V**	50–0			
		20	1·70	33·69	26·97	,,	100–50			
		30	1·68	33·70	26·98	,,	250–100			

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force	Direction	Force			Dry bulb	Wet bulb	
WS 516 *cont.*	66° 25½′ S, 71° 38½′ W	1930 12 ii											
WS 517	66° 17½′ S, 71° 57′ W	12 ii	0835	2770 y. M. bl. c. S. sm. St.	—	0	—	0	o.	982·7	3·1	2·2	heavy NW swell
WS 518	51° 55½′ S, 55° 35′ W	27 ii	0005	1258 y. M. bl. y. S. f. G.	NW	4	NW	3	b.	1025·3	7·5	7·2	
WS 519	52° 09½′ S, 53° 21½′ W	27 ii	1055	2270 ? R	WNW	6	WNW	5	c.	1018·9	7·0	6·1	

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 516 *cont.*	13	35	1·62	—	—	**N 70 V**	500–250			
		40	−0·60	33·96	27·31	,,	750–500			
		50	−1·48	33·98	27·36	,,	1000–750	—	0445	
		60	−1·50	33·99	27·37	**N 70 B**	90–0	0653	0713	KT
		80	−1·08	34·15	27·49	**N 100 B**				
		100	−0·12	34·34	27·60					
		125	0·58							
		150	1·40	34·57	27·69					
		200	1·50	34·62	27·73					
		300	1·50	34·66	27·76					
		400	1·67	34·70	27·78					
		600	1·60	34·71	27·79					
		800	1·43	34·71	27·80					
		1000	1·23	34·70	27·81					
		1500	0·93	34·70	27·83					
		2000	0·47	34·70	27·86					
		2500	0·51	34·70	27·86					
WS 517	14	0	1·95	33·59	26·87	**N 50 V**	100–0	0835		
		10	1·90	33·60	26·88	**N 70 V**	50–0			
		20	1·90	33·59	26·87	,,	100–50			
		30	1·80	33·64	26·92	,,	250–100			
		40	−0·55	33·91	27·27	,,	500–250			
		50	−1·30	34·05	27·41	,,	750–500			
		60	−1·04	34·14	27·48	,,	1000–750	—	1115	
		80	−0·55	34·29	27·58	**N 70 B**	114–0	1213	1233	KT
		100	0·12	34·38	27·62	**N 100 B**				
		150	0·98	34·53	27·69					
		200	1·20	34·58	27·72					
		300	1·62	34·67	27·76					
		400	1·62	34·70	27·78					
		600	1·59	34·70	27·78					
		800	1·41	34·70	27·80					
		1000	1·27	34·72	27·82					
		1500	0·92	34·72	27·84					
		2000	0·59	34·69	27·84					
		2500	0·37	34·68	27·85					
WS 518	28	0	7·39	34·04	26·63	**N 50 V**	100–0	**0015**		
		10	7·29	34·11	26·70	**N 70 V**	50–0			
		20	6·79	34·12	26·77	,,	100–50			
		30	6·71	34·12	26·78	,,	250–100			
		40	6·63	34·13	26·80	,,	500–250			
		50	6·61	34·14	26·81	,,	750–500			
		60	6·59	34·14	26·82	,,	1000–750	—	**0250**	
		80	6·31	34·17	26·88	**N 70 B**	87–0	**0305**	**0325**	KT
		100	4·60	34·19	27·10					
		150	4·29	34·20	27·14					
		200	4·12	34·20	27·16					
		300	3·60	34·20	27·21					
		400	3·33	34·20	27·24					
		600	3·14	34·22	27·27	—	—	—	—	
		800	2·76	34·25	27·33	—	—	—	—	moderately heavy stray on wire
		1000	2·72	34·34	27·40	—	—	—	—	
		1200	2·56	34·42	27·48	—	—	—	—	
WS 519	29	0	5·79	33·94	26·76	**N 50 V**	100–0	1100		
		10	5·77	33·96	26·78	**N 70 V**	50–0			
		20	5·69	33·96	26·79	,,	100–50			
		30	5·39	33·96	26·83	,,	250–100			
		40	5·27	33·96	26·84	,,	500–250			
		50	5·24	33·95	26·83	,,	750–500			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
WS 519 *cont.*	52° 09½′ S, 53° 21½′ W	1930 27 ii											
WS 520	52° 25′ S, 51° 20′ W	27–28 ii	2150	3128 y. M.	NW	6	NW	5	o. c.	1011·3	7·5	7·5	
WS 521	52° 41′ S, 49° 14′ W	28 ii	0950	3780 y. bl. S. M. G.	NW	4	NW	4	o. f. m. c.	1011·8	6·7	6·7	heavy SW swell
WS 522	52° 56′ S, 47° 14′ W	28 ii–1 iii	2235	2550 y. bl. S. M. G.	NW	5	NW	5	b.	1010·8	6·7	6·7	heavy SW swell

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
WS 519 *cont.*	29	60	5·19	33·95	26·84	**N 70 V**	1000–750	—	1300	
		80	3·67	33·95	27·01	**N 70 B**	89–0	1405	1425	KT
		100	2·30	33·95	27·13	**N 100 B**				
		150	0·96	33·99	27·26					
		200	0·40	34·02	27·32					
		300	0·40	34·26	27·51					
		400	1·52	34·38	27·53					
		600	1·94	34·52	27·61					
		800	2·14	34·63	27·69					
		1000	2·13	34·64	27·69					
		1500	1·93	34·71	27·77					
		2000	1·63	34·71	27·79					
WS 520	29	0	6·35	34·10	26·81	**N 50 V**	100–0	**2155**		
		10	6·33	34·11	26·83	**N 70 V**	50–0			
		20	6·33	34·11	26·83	,,	100–50			
		30	6·33	34·11	26·83	,,	250–100			
		40	6·33	34·11	26·83	,,	500–250			
		50	6·09	34·11	26·86	,,	750–500			
		60	5·87	34·13	26·90	,,	1000–750	—	**2355**	
		80	5·11	34·16	27·02	**N 70 B**	125–0	**0141**	**0201**	KT
		100	4·40	34·18	27·11	**N 100 B**				
		150	4·27	34·20	27·14					
		200	3·78	34·20	27·19					
		300	3·49	34·21	27·23					
		400	2·77	34·21	27·30					
		600	2·62	34·42	27·48					
		800	2·68	34·45	27·50					
		1000	2·40	34·52	27·58					
		1500	2·12	34·70	27·74					
		2000	1·84	34·73	27·79					
		2500	1·29	34·72	27·82					
		3000	0·89	34·72	27·85					
WS 521	0	0	4·59	34·00	26·95	**N 50 V**	100–0	0955		
		10	4·67	34·00	26·94	**N 70 V**	50–0			
		20	4·57	34·00	26·95	,,	100–50			
		30	4·57	34·00	26·95	,,	250–100			
		40	4·39	34·00	26·97	,,	500–250			
		50	4·06	34·02	27·02	,,	750–500			
		60	3·94	34·02	27·03	,,	1000–750	—	1220	
		80	3·85	34·02	27·04	**N 70 B**	112–0	1309	1329	KT
		100	3·52	34·09	27·13	**N 100 B**				
		125	2·87							
		150	2·40	34·11	27·25					
		200	1·68	34·11	27·30					
		300	1·82	34·20	27·37					
		400	2·25	34·31	27·42					
		600	2·36	34·45	27·53					
		800	2·22	34·53	27·60					
		1000	2·17	34·61	27·67					
		1500	1·98	34·71	27·76					
		2000	1·70	34·73	27·80					
		2500	1·29	34·72	27·82					
		3000	0·97	34·72	27·84					
WS 522	0	0	4·34	33·92	26·91	**N 50 V**	100–0	**2300**		
		10	4·34	33·92	26·91	**N 70 V**	50–0			
		20	4·34	33·93	26·92	,,	100–50			
		30	4·29	33·93	26·93	,,	250–100			
		40	4·14	33·93	26·94	,,	500–250			
		50	3·94	33·93	26·96	,,	750–500			

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force	Direction	Force			Dry bulb	Wet bulb	
WS 522 *cont.*	52° 56′ S, 47° 14′ W	1930 28 ii –1 iii											
WS 523	53° 07′ S, 45° 00′ W	1 iii	1135	2250 G. S.	NW	4	NW	4	o. m.	1011·0	6·7	6·7	mod. W swell
WS 524	53° 36′ S, 43° 00′ W	2 iii	0750	1697 gy. S. M.	NNW	4	NNW	4	o.	1006·0	5·7	5·6	heavy W swell
WS 525	53° 38½′ S, 41° 09′ W	2–3 iii	2250	162 G. R.?	N W	3	N × W	3	o. f. c.	1000·1	4·7	4·7	

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 522 *cont.*	0	60	3·69	33·93	26·99	**N 70 V**	1000–750	—	**0100**	
		80	3·66	33·95	27·00	**N 70 B**	118–0	**0222**	**0242**	KT
		90	1·39	—	—	**N 100 B**	110–0	**0314**	**0334**	KT
		100	1·01	34·01	27·27					
		150	0·84	34·08	27·34					
		200	1·05	34·18	27·40					
		300	1·59	34·34	27·50					
		400	1·91	34·44	27·55					
		600	2·08	34·52	27·60					
		800	2·07	34·61	27·67					
		1000	2·04	34·66	27·72					
		1500	1·86	34·71	27·77	—	—	—	—	very heavy stray on wire
		2000	1·50	34·71	27·80	—	—	—	—	
		2400	1·19	34·70	27·81	—	—	—	—	
WS 523	1	0	4·16	33·94	26·95	**N 50 V**	100–0	1135		
		10	4·07	33·94	26·96	**N 70 V**	50–0			
		20	3·79	33·94	26·99	,,	100–50			
		30	3·71	33·94	26·99	,,	250–100			
		40	3·63	33·94	27·00	,,	500–250			
		50	3·58	33·94	27·01	,,	750–500			
		60	3·21	33·94	27·04	,,	1000–750	—	1355	
		80	1·60	33·94	27·17	**N 70 B**	112–0	1434	1454	KT
		100	0·60	33·98	27·27	**N 100 B**				
		150	0·38	34·05	27·34					
		200	1·09	34·20	27·42					
		300	1·78	34·34	27·48					
		400	2·05	34·43	27·53					
		600	2·13	34·54	27·61					
		800	2·12	34·64	27·69					
		1000	2·02	34·70	27·75					
		1500	1·70	34·72	27·79					
		2000	1·19	34·71	27·82					
WS 524	2	0	3·42	33·92	27·00	**N 50 V**	100–0	0750		
		10	3·39	33·94	27·02	**N 70 V**	50–0			
		20	3·39	33·94	27·02	,,	100–50			
		30	3·37	33·94	27·03	,,	250–100			
		40	3·33	33·94	27·03	,,	500–250			
		50	3·33	33·94	27·03	,,	750–500			
		60	3·31	33·94	27·03	,,	1000–740	—	0932	
		80	2·89	33·94	27·07	**N 70 B**	103–0	1022	1042	KT. Part of catch lost
		100	1·91	34·01	27·21	**N 100 B**				
		150	0·75	34·08	27·34					
		200	1·23	34·22	27·42					
		300	1·78	34·37	27·51					
		400	1·95	34·49	27·59					
		600	1·99	34·54	27·63					
		800	1·95	34·65	27·72					
		1000	1·82	34·71	27·77					
		1500	1·43	34·71	27·80					
WS 525	2	0	3·21	33·93	27·03	**N 50 V**	100–0	**2255**		
		10	3·19	33·93	27·03	**N 70 V**	50–0			
		20	3·19	33·93	27·03	,,	150–50	—	**2320**	
		30	3·09	33·93	27·05	**N 70 B**	91–0	**2345**	**0005**	KT
		40	3·01	33·93	27·05	**N 100 B**				
		50	2·91	33·94	27·07					
		60	2·48	33·95	27·11					
		80	2·12	34·02	27·20					
		100	1·90	34·05	27·24					
		150	1·40	34·17	27·37					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Air Temp. °C. Wet bulb	Remarks
WS 526	53° 51′ S, 39° 45′ W	1930 3 iii	1030	1545 gn. br. M.	ENE	4	ENE	3–4	o. f. c.	993·7	4·4	4·4	
WS 527	57° 30′ S, 45° 35′ W	30 iii	0800	3570	W × S	5	W × S	4	o. m.	978·7	2·7	2·5	heavy W swell
WS 528	56° 53′ S, 49° 46′ W	31 iii	0800	3179 G.	NW	3	NW	3	f. c. o.	977·4	4·7	4·7	

Station	Age of moon (days)	Hydrological observations: Depth (metres)	Temp. °C.	S ‰	σt	Biological observations: Gear	Depth (metres)	Time: From	Time: To	Remarks
WS 526	3	0	2·92	33·88	27·02	**N 50 V**	100–0	1037		
		10	2·89	33·88	27·02	**N 70 V**	50–0			
		20	2·87	33·88	27·03	,,	100–50			
		30	2·83	33·88	27·03	,,	250–100			
		40	2·64	33·88	27·04	,,	500–250			
		50	2·50	33·91	27·08	,,	750–500			
		60	2·43	33·92	27·09	,,	1000–750	—	1210	
		80	2·04	33·92	27·12	**N 70 B**	89–0	1405	1425	KT
		100	1·78	33·96	27·18	**N 100 B**				
		110	0·84							
		125	0·53							
		150	0·46	34·10	27·37					
		200	1·18	34·26	27·46					
		300	1·80	34·41	27·53					
		400	1·90	34·49	27·59					
		600	2·00	34·54	27·63	—	—	—	—	very heavy stray on wire
		800	1·93	34·64	27·71	—	—	—	—	
		1000	1·83	34·72	27·78		—	—	—	
		1500	1·43	34·72	27·81	—	—	—	—	
WS 527	0	0	1·62	33·95	27·18	**N 50 V**	100–0	0812		
		10	1·62	33·95	27·18	**N 70 V**	50–0			
		20	1·62	33·95	27·18	,,	100–50			
		30	1·60	33·96	27·19	,,	250–100			
		40	1·60	33·97	27·20	,,	500–250			
		50	1·57	33·97	27·20	,,	750–500			
		60	1·53	34·01	27·23	,,	1000–750	—	1020	
		80	1·08	34·05	27·30	**N 70 B**	119–0	1245	1314	KT
		100	0·50	34·20	27·45	**N 100 B**				
		150	0·85	34·29	27·50					
		200	1·22	34·36	27·54					
		300	1·78	34·53	27·63					
		400	1·88	34·61	27·69					
		600	1·94	34·65	27·72					
		800	1·84	34·71	27·77					
		1000	1·71	34·73	27·80					
		1500	1·27	34·73	27·83					
		2000	0·79	34·72	27·85	—	—	—	—	moderate stray on wire
		2500	0·68	34·71	27·85	—	—	—	—	
		3000	0·39	34·70	27·86	—	—	—	—	
		3400	0·22	34·70	27·87	—	—	—	—	
WS 528	1	0	2·40	33·90	27·08	**N 50 V**	100–0	0800		
		10	2·38	33·92	27·10	**N 70 V**	50–0			
		20	2·38	33·93	27·11	,,	100–50			
		30	2·36	33·93	27·11	,,	250–100			
		40	2·31	33·92	27·10	,,	500–250			
		50	2·22	33·92	27·11	,,	750–500			
		60	2·11	33·92	27·12	,,	1000–750	—	1030	
		70	1·14	—	—	**N 70 B**	98–0	1430	1450	KT
		80	0·70	34·07	27·34	**N 100 B**				
		100	0·62	34·11	27·37					
		150	0·99	34·14	27·38					
		200	0·62	34·18	27·43					
		300	1·62	34·33	27·48					
		400	2·00	34·48	27·58					
		600	2·11	34·62	27·68					
		800	2·15	34·68	27·72					
		1000	2·02	34·71	27·76					
		1500	1·66	34·73	27·80					
		2000	1·12	34·73	27·84					

Station	Position	Date	Hour	Sounding (metres)	WIND		SEA		Weather	Barometer (millibars)	Air Temp. ° C.		Remarks
					Direction	Force	Direction	Force			Dry bulb	Wet bulb	
WS 529	56° 05′ S, 53° 45′ W	1930 2 iv	0930	4100	W	5	W	5	b.	980·6	5·0	4·7	
WS 530	55° 22′ S, 57° 46′ W	3–4 iv	2150	4950	SW × W	5	SW × W	6	b. c.	1011·8	5·3	4·7	very high confused S and W swell
WS 531	54° 25½′ S, 61° 25½′ W	5 iv	1215	118 S. Co. Sh. St.	NNW	2	NNW	1	b. c.	1008·3	7·8	7·8	
WS 532	52° 49′ S, 37° 15′ W	1931 10 i	1120	2132 G.	W	4	W	4	o. c.	998·4	3·8		

Station	Age of moon (days)	Hydrological observations				Biological observations				Remarks
		Depth (metres)	Temp. C.	S ‰	σt	Gear	Depth (metres)	Time		
								From	To	
WS 529	3	0	2·40	33·89	27·07	**N 50 V**	100–0	0930		
		10	2·37	33·89	27·07	**N 70 V**	50–0			
		20	2·35	33·89	27·08	,,	100–50			
		30	2·32	33·89	27·08	,,	250–100			
		40	2·32	33·89	27·08	,,	500–250			
		50	2·30	33·89	27·08	,,	750–500			
		60	2·30	33·89	27·08	,,	1000–750	—	1200	
		80	2·10	33·91	27·11	**N 70 B**	128–0	1539	1559	KT
		100	1·22	34·02	27·26	**N 100 B**				
		150	0·03	34·07	27·37					
		200	0·30	34·19	27·46					
		300	1·26	34·37	27·54					
		400	1·78	34·50	27·61					
		600	1·87	34·60	27·68					
		800	1·96	34·63	27·70					
		1000	1·94	34·70	27·76					
		1500	1·68	34·73	27·80					
		2000	1·28	34·73	27·83					
		2500	0·92	34·71	27·84					
		3000	0·63	34·71	27·86					
		3500	0·34	34·70	27·86					
WS 530	5	0	5·77	34·12	26·90	**N 50 V**	100–0	2200		
		10	5·77	34·12	26·90	**N 70 V**	50–0			
		20	5·79	34·12	26·90	,,	100–50			
		30	5·79	34·12	26·90	,,	250–100			
		40	5·79	34·12	26·90	,,	500–250			
		50	5·79	34·13	26·91	,,	750–500			
		60	5·74	34·13	26·92	,,	1000–750	—	0110	
		80	5·59	34·13	26·94	**N 70 B**	101–0	0338	0358	KT
		100	5·49	34·13	26·95	**N 100 B**				
		150	4·94	34·20	27·07					
		200	4·82	34·21	27·09					
		300	4·61	34·22	27·12					
		400	4·43	34·22	27·14					
		600	3·88	34·22	27·20					
		800	3·60	34·26	27·26					
		1000	3·25	34·35	27·36					
		1500	2·56	34·51	27·55					
		2000	2·33	34·61	27·65					
		2500	2·09	34·70	27·75					
		3000	2·04	34·70	27·75					
		3500	1·85	34·72	27·78					
WS 531	6	0	6·35	34·11	26·82	**N 50 V**	100–0	1215		
		10	6·21	34·12	26·85	**N 70 V**	50–0			
		20	6·21	34·12	26·85	,,	100–50	—	1240	
		30	6·21	34·12	26·85	**N 70 B**	73–0	1303	1318	KT
		40	6·19	34·12	26·85	**N 100 B**				
		50	6·19	34·12	26·85					
		60	6·19	34·12	26·85					
		80	6·19	34·12	26·85					
		100	6·19	34·13	26·86					
WS 532	—	0	1·31	33·84	27·11	**N 50 V**	100–0	1120	1125	
		10	1·26	33·85	27·13	,,	,,	1644	1649	
		20	1·26	33·85	27·13					
		30	1·36	33·85	27·12					
		40	0·98	33·86	27·15					
		50	0·92	33·87	27·16					
		60	0·80	33·87	27·17					
		80	0·45	33·89	27·21					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Remarks
WS 532 *cont.*	52° 49′ S, 37° 15′ W	1931 10 i										
WS 533	2¾ miles S 52° E from Jason light, Cumberland Bay, South Georgia	22 i	1100	—	ESE	3	ESE	2	f. e.	1010·1	3·9	slight SE swell
WS 534	54° 17½′ S, 35° 39′ W	22–23 i	1800	224	SE × S	2	SE	2	f.	1007·6	2·2	slight NNW swell
			2000	—	SE × S	3–4	SE	3	o. m.	1007·0	1·7	,,
			2200	—	SE × S	3	SE	3	o. m.	1006·2	2·2	,,
			0000	—	SE × S	2	SE	2	o. m.	1004·5	1·7	,,
WS 535	55° 12′ S, 31° 51′ W	23 i	2220	—	SW	4	SW	3	b. c.	998·5	1·7	conf. swell
WS 536	56° 28′ S, 27° 21′ W	24 i	2212	—	NE	2	NNE	2	o.	981·5	−1·1	slight NE swell
WS 537	56° 10′ S, 25° 35′ W	25–26 i	2005	6977	SW	3	SW	2	b. c.	981·9	−1·1	NW swell, force 3; near belts of loose pack ice
WS 538	57° 03½′ S, 24° 32′ W	26 i	1335	—	NNW	2	NNW	2	b. c.	980·3	2·2	NW swell, force 2; near pack ice
WS 539	57° 41½′ S, 23° 12′ W	26 i	2215	—	NE	3	NE	3	o. c.	980·6	−1·1	N swell, force 3; near pack ice

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	TIME From	To	Remarks
WS 532 *cont.*	—	100	0·45	34·00	27·30					
		150	0·10	34·14	27·43					
		200	0·90	34·26	27·48					
		300	1·76	34·43	27·56					
		400	1·90	34·51	27·61					
		600	1·97	34·62	27·69					
		800	1·85	34·69	27·76					
		1000	1·68	34·69	27·77					
		1500	1·31	34·69	27·79					
		2000	0·87							
WS 533	4	0	2·48	33·47	26·73	**N 50 V**	100–0	1100	—	$-1\frac{3}{4}$ hours G.M.T.
						,,	,,	—	1110	
WS 534	4	0	1·77	33·87	27·11	**N 100 H**	5 (–0)	1751	1758	first surface water sample at
		0	1·47	33·87	27·13	,,	,,	1758	1810	1830 and second at **0000**
		10	1·45	33·87	27·13	,,	,,	1810	1817	seven consecutive hauls (A–G)
		20	1·24	33·87	27·14	,,	,,	1817	1825	towed north-westwards from
		30	1·09	33·87	27·15	,,	,,	1825	1855	position of station, and fol-
		40	0·97	33·88	27·17	,,	,,	1857	1927	lowed by five consecutive hauls
		50	0·97	33·88	27·17	,,	,,	1928	1958	(H, J, K, L and M) towed
		60	1·03	33·89	27·17	,,	,,	2040	2047	south-eastwards from position
		80	0·99	33·89	27·18	,,	,,	**2131**	**2140**	of station
		100	0·91	33·89	27·18	,,	,,	**2144**	**2154**	
		150	0·21	34·01	27·32	,,	,,	**2200**	**2210**	
		200	0·41	34·13	27·40	,,	,,	**2220**	**2230**	
						LH	5	2100	2101	
						N 100 B	53–0	**2132**	**2203**	KT
						N 50 V	100–0	**2315**		
						N 70 V	50–0			
						,,	100–50			
						,,	222–100	—	**0000**	
						N 50 V	100–0	**0135**	**0137**	
WS 535	5	0	1·20	33·46	26·82	**N 50 V**	100–0	**2220**	**2222**	
						N 70 B	78–0	**2250**	**2310**	KT
						N 100 B				
WS 536	5	0	–0·11	33·68	27·07	**N 50 V**	100–0	**2212**	**2213**	
						N 70 B	102–0	**2245**	**2305**	KT
						N 100 B				
WS 537	6	0	0·57	33·76	27·10	**N 50 V**	100–0	2005		
		10	0·60	33·76	27·10	**N 70 V**	50–0			
		20	0·60	33·76	27·10	,,	100–50			
		30	0·56	33·76	27·10	,,	250–100			
		40	0·47	33·79	27·13	,,	500–250			
		50	0·34	33·83	27·16	,,	750–500			
		60	0·00	33·84	27·19	,,	1000–750	—	**2320**	
		80	–0·50	33·90	27·26	**N 70 B**	67–0	**0110**	**0130**	KT
		100	–0·90	34·00	27·36	**N 100 B**				
		150	0·24	34·38	27·61					
		200	1·00	34·48	27·65					
		300	1·39	34·61	27·73					
		400	1·41	34·61	27·73					
WS 538	7	0	0·35	33·34	26·77	**N 50 V**	100–0	1413	1415	
						N 70 B	97–0	1335	1355	KT
						N 100 B				
WS 539	7	0	–0·30	33·18	26·67	**N 50 V**	100–0	**2215**	**2217**	
						N 70 B	113–0	**2240**	**2300**	KT
						N 100 B				

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. C. Dry bulb	Remarks
WS 540	57° 55′ S, 21° 21′ W	1931 27–28 i	1455	—	ENE	2	ENE	3	o. s.	978·1	0·6	in lee of a belt of pack ice
WS 541	57° 51½′ S, 19° 51½′ W	28 i	1245	—	SW × W	4	SW × W	4	o. c.	978·5	1·1	conf. swell, force 3
WS 542	58° 39′ S, 18° 13′ W	28 i	2210	—	W	6	W	5	b. c.	978·9	– 1·1	W swell, force 3
WS 543	60° 10½′ S, 18° 00′ W	29 i	1420	—	S × E	7	S × E	5	o. c.	979·1	0·6	SSE swell, force 6
WS 544	60° 59′ S, 17° 50′ W	29 i	2025	—	SSE	6	SSE	5	o. s.	984·8	0·0	SSE swell, force 6
WS 545	61° 51′ S, 17° 15′ W	30 i	1413	—	S	5	S	5	c.	995·3	– 0·6	SSE swell, force 6
WS 546	62° 09′ S, 17° 12′ W	30 i	1750	—	S × W	4	S	4	c.	998·4	– 0·6	SSE swell, force 6
WS 547	62° 40′ S, 17° 02′ W	30 i	2210	—	S × W	4	S	4	b. c	1000·5	– 1·1	SSE swell, force 6
WS 548	64° 07′ S, 15° 38′ W	31 i	1320	—	S × E	4	S × E	2	o.	1003·0	– 0·6	SSE swell, force 4
WS 549	65° 17′ S, 15° 33′ W	31 i	2210	—	SSW	2	SSW	2	c.	1002·2	– 0·6	SE swell, force 3
WS 550	66° 51½′ S, 15° 24′ W	1 ii	1015	—	WSW	3–4	WSW	3	o.	997·8	0·6	S swell, force 3
WS 551	68° 17½′ S, 14° 26½′ W	1 ii	2030	—	WSW	2	WSW	2	o.	998·2	– 0·6	conf. swell
WS 552 A	68° 53′ S, 13° 03′ W to 68° 50′ S, 13° 03′ W	2 ii	1140	—	—	1	—	0	c.	1001·6	1·7	no swell. Station at edge of pack ice

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 540	8	0	0·30	33·17	26·66	**N 70 H**	5 (−0)	1455	1508	
		10	−0·38	33·18	26·68	**N 100 H**	10 (−0)			
		20	−0·19	33·23	26·71	,,	4 (−0)	1610	1611	70 secs. haul with N 100 H
		30	−0·10	33·40	26·84	,,	2 (−0)	1617	1619	110 ,,
		40	−0·10	33·58	26·99	,,	1–2 (−0)	1624	1625	36 ,,
		50	−0·20	33·61	27·02	,,	2–3 (−0)	1630	1631	45 ,,
		60	−0·10	33·76	27·13	,,	1–2 (−0)	1655	1656	35 ,,
		80	−0·14	33·79	27·16	,,	1–3 (−0)	1715	1716	25 ,,
		100	−0·56	33·88	27·25	**N 50 V**	100–0	**2245**		
		150	−1·22	34·10	27·45	**N 70 V**	50–0			
		200	−0·55	34·33	27·61	,,	100–50			
		300	0·95	34·49	27·66	,,	250–100			
		400	1·06	34·61	27·75	,,	500–250			
						,,	750–500			
						,,	1000–750		**0230**	
WS 541	9	0	0·68	33·35	26·76	**N 50 V**	100–0	1245	1247	
						N 70 B / **N 100 B**	102–0	1209	1230	KT
WS 542	9	0	−0·09	33·40	26·84	**N 50 V**	100–0	**2210**	**2212**	
						N 70 B / **N 100 B**	77–0	**2235**	**2255**	KT
WS 543	10	0	−0·45	33·45	26·90	**N 50 V**	100–0	1500	1502	
						N 70 B / **N 100 B**	120–0	1420	1440	KT
WS 544	10	0	−0·93	33·53	26·98	**N 70 B** / **N 100 B**	146–0	**2025**	**2045**	KT
WS 545	11	0	−0·92	34·07	27·42	**N 50 V**	100–0	1455	1457	
						N 70 B / **N 100 B**	124–0	1413	1434	KT
WS 546	11	0	−0·90	34·06	27·41	**N 70 H**	1–2 (−0)	1750	1755	
						N 100 H	3–4 (−0)			
WS 547	11	0	−0·85	33·96	27·32	**N 50 V**	100–0	**2210**	**2212**	
						N 70 B / **N 100 B**	154–0	**2230**	**2250**	KT
WS 548	12	0	−0·58	34·06	27·39	**N 50 V**	100–0	1353	1355	
						N 70 B / **N 100 B**	106–0	1320	1340	KT
WS 549	12	0	−0·50	34·14	27·46	**N 50 V**	100–0	**2210**	**2212**	
						N 70 B / **N 100 B**	128–0	**2230**	**2250**	KT
WS 550	13	0	−0·23	34·06	27·38	**N 50 V**	100–0	1045	1047	
						N 70 B / **N 100 B**	121–0	1015	1035	KT
WS 551	13	0	−1·27	33·91	27·30	**N 50 V**	100–0	2030	2032	
						N 70 B / **N 100 B**	121–0	2045	2105	KT
WS 552 A	14	0	−0·90	33·91	27·29	**N 100 B**	60–0	1225	1240	
						,,	170–90	,,	1243½	KT
						,,	260–170	,,	1244	
						,,	360–260	,,	1244½	
						,,	460–360	,,	1245	
						N 50 V	100–0	1424	—	four control hauls (a–d)

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Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Remarks
WS 552 A *cont.*	68° 53′ S, 13° 03′ W to 68° 50′ S, 13° 03′ W	1931 2 ii										
WS 552 B	68° 53′ S, 13° 03′ W to 68° 50′ S, 13° 03′ W	2 ii	1558	—	—	1	—	0	o.	1001·2	0·0	N swell, force 1
WS 552 C	68° 53′ S, 13° 03′ W to 68° 50′ S, 13° 03′ W	2 ii	1958	—	—	0	—	0	o.	1001·0	−1·1	N swell, force 2
WS 552 D	68° 53′ S, 13° 03′ W to 68° 50′ S, 13° 03′ W	3 ii	0000	—	—	0	—	0	o.	1000·2	−1·7	N swell, force 2
WS 552 E	68° 53′ S, 13° 03′ W to 68° 50′ S, 13° 03′ W	3 ii	0350	—	—	1	—	0	o. s.	998·7	−1·7	N swell, force 2
WS 552 F	68° 53′ S, 13° 03′ W to 68° 50′ S, 13° 03′ W	3 ii	0740	4845 f. gy. S. M.	—	0	—	0	o.	996·7	−1·1	N swell, force 2

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 552 A *cont.*	14	0	—	—	—	**N 50 V**	100–0			
						,,	,,			
						,,	,,	—	1446	
						N 70 V	50–0	1512		
						,,	100–50			
						,,	150–100			
						,,	200–150			
						,,	250–200			
						,,	300–250	—	1543	
WS 552 B	14	0	−0·99	33·90	27·28	**N 100 B**	100–0	1632	1653½	KT
						,,	210–100	,,	1654	
						,,	330–210	,,	1654½	
						,,	440–320	,,	1655	
						,,	560–450	,,	1655½	
						N 70 V	50–0	1908		
						,,	100–50			
						,,	150–100			
						,,	200–150			
						,,	250–200			
						,,	300–250	—	1949	
WS 552 C	14	0	−1·09	33·91	27·29	**N 100 B**	110–0	2045	2105	KT
						,,	200–90	,,	2106	
						,,	290–170	,,	2106½	
						,,	390–260	,,	2107	
						,,	490–360	,,	2107½	
						N 70 V	50–0	2255		
						,,	100–50			
						,,	150–100			
						,,	200–150			
						,,	250–200			
						,,	300–250	—	2340	
WS 552 D	15	0	−1·16	33·88	27·27	**N 100 B**	60–0	0045	0105	KT
						,,	130–60	,,	0106	KT
						,,	200–130	,,	0106½	
						,,	270–200	,,	0107	
						,,	340–270	,,	0107½	
						N 70 V	50–0	0236		
						,,	100–50			
						,,	150–100			
						,,	200–150			
						,,	250–200			
						,,	300–250			
						,,	500–0	—	0327	
WS 552 E	15	0	−1·20	33·89	27·28	**N 100 B**	90–0	0425	0446	KT
						,,	190–90	,,	0448½	
						,,	290–190	,,	0449	
						,,	390–290	,,	0449½	
						,,	500–390	,,	0450	
						N 70 V	50–0	0642		
						,,	100–50			
						,,	150–100			
						,,	200–150			
						,,	250–200			
						,,	300–250	—	0727	
WS 552 F	15	0	−1·25	33·91	27·30	**N 100 B**	90–0	0827	0849	KT
		10	−1·30	33·91	27·30	,,	180–90	,,	0850	KT
		20	−1·35	33·91	27·30	,,	270–180	,,	0850½	

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Remarks
WS 552 F *cont.*	68° 53′ S, 13° 03′ W to 68° 50′ S, 13° 03′ W	1931 3 ii										
WS 553	66° 14′ S, 15° 34′ W	4 ii	1415	5029 f. gy. S. M.	E × N	2	E × N	2	b. c.	995·8	1·7	ENE swell, force 2
WS 554	63° 20′ S, 17° 23′ W	5 ii	1454	5143	SSE	3	SSE	2	o. c.	998·6	0·6	N swell, force 2
WS 555	60° 27′ S, 19° 36′ W	6 ii	1715	3850 f. gy. S. M.	SW	5	SW	5	o.	1005·9	0·6	SW swell, force 5

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. C.	S ‰	σ_t	Gear	Depth (metres)	TIME From	TIME To	
WS 552 F *cont.*	15	30	−1·36	33·92	27·31	**N 100 B**	360–270	0827	0851	
		40	−1·49	34·01	27·38	,,	460–360	,,	0851½	
		50	−1·70	—	—	**N 70 V**	25–0	1004	—	N 70 V labelled F1
		60	−1·70	34·31	27·63	,,	25–0	—	—	,, F2
		80	−1·67	34·31	27·63	,,	50–25	—	—	,, F1
		100	−1·30	34·27	27·59	,,	50–25	—	—	,, F2
		150	−1·20?	34·53?	27·80?	,,	100–50			
		200	0·90	34·56	27·72	,,	150–100			
		300	0·88	34·57	27·73	,,	200–150			
		400	0·80	—	—	,,	250–200			
		600	0·65	34·69	27·84	,,	300–250			
		800	0·51	34·70	27·85	,,	500–250			
		1000	0·41	34·68	27·85	,,	750–500			
		1500	0·20	34·68	27·86	,,	1000–750	—	1232	
		2000	0·00	34·68	27·87					
		2500	−0·16	34·66	27·86					
WS 553	16	0	−0·18	34·13	27·43	**N 70 V**	50–0	1415		
		10	−0·20	34·13	27·43	,,	100–50			
		20	−0·20	34·13	27·43	,,	250–100			
		30	−0·30	34·12	27·43	,,	500–250			
		40	−0·48	34·15	27·46	,,	750–500			
		50	−1·70	34·40	27·71	,,	1000–750	—	1615	
		60	−1·70	34·36	27·67					
		80	−1·74	34·34	26·66					
		100	−1·70	34·44	27·74					
		150	0·25	34·47	27·69					
		200	0·68	34·67	27·82					
		300	0·60	34·67	27·83					
		400								
		600	0·42	34·67	27·84					
		800	0·34	34·69	27·86					
		1000	0·26							
		1500	0·13	34·67	27·85					
		2000	0·30	34·67	27·84					
		2500	0·19	34·66	27·84					
WS 554	17	0	−0·20	33·96	27·30	**N 50 V**	100–0	1454		
		10	−0·25	33·96	27·30	**N 70 V**	50–0			
		20	−0·40	33·96	27·31	,,	100–50			
		30	−1·49	34·38	27·68	,,	250–100			
		40	−1·70	34·47	27·76	,,	500–250			
		50	−1·75	34·46	27·76	,,	750–500			
		60	−1·77	34·42	27·73	,,	1000–750	—	1630	
		80	−1·80	34·43	27·73					
		100	−1·80	34·42	27·73					
		150	−0·35							
		200	0·22	34·60	27·79					
		300	0·35	34·55	27·74					
		400	0·37	34·63	27·81					
		600	0·37	34·68	27·85					
		800	0·29	34·68	27·85					
		1000	0·20	34·67	27·85					
		1500	0·00	34·65	27·84					
		2000	−0·14	34·66	27·86					
		2500	−0·31	34·66	27·87					
		3000	−0·32	34·63	27·84					
		3500	−0·40	34·64	27·85					
		4000	−0·46	34·64	27·86					
WS 555	18	0	−0·36	33·30	26·77	**N 70 V**	50–0	1750		
		10	−0·38	33·30	26·77	,,	100–50			

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Remarks
WS 555 *cont.*	60° 27′ S, 19° 36′ W	1931 6 ii										
WS 556	58° 51′ S, 21° 21′ W	7 ii	1405	—	NE	5	NE	4	o. c.	1001·4	0·0	NE swell, force 4
WS 557	58° 01′ S, 21° 40′ W	8 ii	0610	—	ESE	6–7	ESE	5	o. q.	990·4	– 0·6	ESE swell, force 5
WS 558	57° 41′ S, 23° 12′ W	8 ii	1525	—	SE	5	SE	5	o. c.	997·4	1·1	conf. swell, force 6
WS 559	57° 19′ S, 24° 50′ W	8 ii	2135	—	SSW	6	SSW	5	o.	1003·5	0·0	SSW swell, force 6
WS 560	56° 27′ S, 28° 59′ W	9 ii	2120	—	SSW	5	SW × S	4	o.	1015·4	0·0	SW swell, force 4
WS 561	55° 22′ S, 33° 04′ W	10 ii	2115	—	SW	4	SW	4	o.	1013·5	0·0	SW swell, force 4
WS 562	$2\frac{3}{4}$ miles S 52° E from Jason light, Cumberland Bay, South Georgia	11 ii	1800	—	NNW	4	NNW	3	c.	1022·0	3·9	conf. swell
WS 563	Government Jetty, Grytviken, South Georgia	13 ii	1200	—	var.	2	—	—	b.	1009·5	6·7	
WS 564	Moltke Harbour, South Georgia	21 ii	—	—	NW × W	6	—	—	o. s.	984·9	1·7	
WS 565	54° 50′ S, 35° 53′ W	24 ii	1325	—	SW	2	SW	1	c.	1013·5	3·3	SW swell, force 2

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 555 *cont.*	18	20	−0·40	33·30	26·77	**N 70 V**	250–100			
		30	−0·53	33·34	26·81	,,	500–250			
		40	−1·31	33·79	27·20	,,	750–500			
		50	−1·15	33·78	27·19	,,	1000–750	—	1930	
		60	−0·97	34·13	27·47	**N 70 B**	174–0	2331	2351	KT
		80	−0·02	34·29	27·55	**N 100 B**				
		100	0·86	34·43	27·62	**N 100 H**	3 (–0)	2318	2338	
		150	1·88	34·44	27·55	,,	5 (–0)	2338	2358	
		200	1·54	34·46	27·59					
		300	1·75	34·65	27·73					
		400	1·72	34·66	27·74					
		600	1·46	34·71	27·80					
		800	1·33	34·70	27·80					
		1000	1·02	34·70	27·82					
		1500	0·53	34·69	27·85					
		2000	0·33	34·70	27·87					
		2500	0·10	34·69	27·87					
		3000	−0·07	34·67	27·86					
		3500	−0·25							
		3850	−0·25	—	—	—	—	—	—	bottle touched bottom
WS 556	19	—	—	—	—	**N 100 H**	4 (–0)	1405	1415	
WS 557	20	0	−0·04	33·24	26·71	**N 100 H**	4 (–0)	0610	0620	
		10	−0·05	33·22	26·69	**N 70 V**	50–0	0630		
		20	−0·06	33·22	26·69	,,	100–50			
		30	−0·30	33·31	26·78	,,	250–100			
		40	−0·83	33·64	27·06	,,	500–250			
		50	−1·01	33·71	27·13	,,	750–500			
		60	−0·96	33·77	27·18	,,	1000–0	—	0820	
		80	−1·00	34·03	27·39	**N 70 B**	88–0	0849	0909	KT
		100	−1·37	34·09	27·45	**N 100 B**				
		150	−0·30	34·34	27·61					
		200	0·70	34·54	27·72					
		300	1·07	34·59	27·73					
		400	1·05	34·63	27·77					
WS 558	20	—	—	—	—	**N 100 H**	1 (–0)	1525	1530	
WS 559	20	0	0·40	33·43	26·84	**N 50 V**	100–0	**2215**	**2217**	
						N 70 B	90–0	**2135**	**2155**	
						N 100 B				
WS 560	21	0	0·70	33·37	26·77	**N 50 V**	100–0	**2120**	**2122**	
						N 70 B	130–0	**2140**	**2200**	KT
						N 100 B				
WS 561	22	0	1·28	33·61	26·93	**N 50 V**	100–0	**2115**	**2117**	
						N 70 B	113–0	**2137**	**2157**	KT
						N 100 B				
WS 562	22	0	2·89	33·65	26·84	**N 50 V**	100–0	1800	1802	
WS 563	—	—	—	—	—	**NH**	1–0	1200	1600	
WS 564	—	—	—	—	—	**Sh. coll.**				
WS 565	7	0	2·00	33·93	27·14	**N 100 B**	20–0	1325	1332	KT

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Remarks
WS 566	$2\frac{3}{4}$ miles S 52° E from Jason light, Cumberland Bay, South Georgia	1931 4 iii	1830	—	NW	6	NW	4	b. c.	1005·5	3·9	
WS 567	53° $54\frac{1}{4}'$ S, 37° $05\frac{1}{2}'$ W	6 iii	1105	130	W	3	W × N	2	b. c.	991·0	3·3	W × N swell, force 2
WS 568	53° $37\frac{1}{4}'$ S, 37° 18′ W	6 iii	1445	180	W × N	4	NW	4	o. f.	991·6	3·9	NW swell, force 6
WS 569	53° $24\frac{1}{2}'$ S, 37° $29\frac{1}{4}'$ W	6 iii	1845	—	NE	1–2	W	5	o. f. r.	986·9	3·3	NW swell, force 3
WS 570	52° 22′ S, 38° 23′ W	8 iii	1700	—	WNW	6–9	WNW	4–7	o. c.	997·7	3·3	NW swell, force 8

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 566	15	0	2·41	33·56	26·81	**N 50 V**	100–0	1830	1832	
WS 567	17	0	2·00	33·73	26·98	**N 50 V**	100–0	1105		
		10	2·00	33·74	26·98	**N 70 V**	50–0			
		20	1·98	33·73	26·98	,,	100–50			
		30	1·89	33·79	27·03	,,	145–100	—	1150	
		40	1·61	33·91	27·15	**N 70 B**	111–0	1224	1244	KT
		50	1·42	33·89	27·15	**N 100 B**				
		60	1·20	33·89	27·16					
		80	0·60	34·03	27·31					
		100	0·43	34·05	27·34					
		120	0·43	34·15	27·42	—	—	—	—	$-1\frac{3}{4}$ hours G.M.T.
WS 568	17	0	2·06	33·85	27·07	**N 50 V**	100–0	1445		
		10	2·04	33·84	27·06	**N 70 V**	50–0			
		20	2·01	33·85	27·07	,,	100–50			
		30	2·00	33·85	27·07	,,	180–100	—	1530	
		40	1·55	33·88	27·13	**N 70 B**	106–0	1601	1621	KT
		50	1·11	33·96	27·22	**N 100 B**				
		60	0·79	33·97	27·25					
		80	0·26	34·06	27·35					
		100	0·20	34·10	27·39					
		150	0·45	34·18	27·44					
WS 569	17	0	2·53	33·76	26·96	**N 50 V**	100–0	1845		
		10	2·49	33·76	26·96	**N 70 V**	50–0			
		20	2·44	33·78	26·98	,,	100–50			
		30	2·40	33·78	26·99	,,	250–100			
		40	2·26	33·81	27·02	,,	500–250			
		50	2·23	33·81	27·02	,,	750–450			
		60	2·05	33·83	27·05	,,	1000–750	—	2210	
		80	0·65	33·97	27·26	**N 70 B**	82–0	**2245**	**2305**	KT
		100	0·15	34·04	27·34	**N 100 B**				
		150	0·46	34·12	27·39					
		200	0·90	34·24	27·46					
		300	1·40	34·37	27·53					
		400	1·84	34·48	27·59					
		600	2·00	34·55	27·63					
		800	1·91	34·64	27·71					
		1000	1·80	34·65	27·73					
		1500	1·44	34·63	27·74					
WS 570	19	0	2·30	33·83	27·03	**N 50 V**	100–0	1700	—	very great stray on wires during the later hauls
		10	2·28	33·83	27·03	**N 70 V**	50–0			
		20	2·27	33·83	27·03	,,	100–50			
		30	2·25	33·82	27·03	,,	250–100			
		40	2·25	33·83	27·04	,,	500–250			
		50	2·19	33·83	27·04	,,	250–0			
		60	2·10	33·84	27·06	,,	750–0	—	2015	
		80	1·02	33·96	27·23	**N 70 B**	120–0	**2130**	**2150**	
		100	0·21	34·07	27·37					
		150	0·54	34·20	27·45					
		200	1·01	34·28	27·49					
		300	1·48	34·39	27·54					
		400	1·88	34·52	27·62					
		600	1·79?							
		800	1·91?							
		1000	1·90?							
		1500	1·79?							

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Remarks
WS 571	$2\frac{3}{4}$ miles S 52° E from Jason light, Cumberland Bay, South Georgia	1931 19 iii	1241	—	NW	1–2	N	1–2	o. c.	981·5	4·4	mod. N swell
WS 572	53° $11\frac{1}{2}$′ S, 37° 41′ W	24 iii	1600	—	W × N	4–5	NW	4	b.	994·8	3·9	NW swell, force 5
WS 573	52° $59\frac{3}{4}$′ S, 37° 48′ W	25 iii	0127	—	N × W	3	NW	3	b. c.	997·3	2·8	NW swell, force 4
WS 574	52° $48\frac{1}{2}$′ S, 38° 04′ W	26 iii	0635	—	N	4–5	NW	3	b.	1002·4	3·3	W swell, force 5

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 571	0	0	2·30	33·68	26·91	**N 50 V**	100–0	1241	1243	−2¼ hours G.M.T.
WS 572	5	0	2·04	33·91	27·12	**N 50 V**	100–0	1600		
		10	2·04	33·91	27·12	**N 70 V**	50–0			
		20	2·04	33·91	27·12	,,	100–50			
		30	2·03	33·91	27·12	,,	250–100			
		40	2·01	33·91	27·12	,,	500–250			
		50	2·00	33·91	27·12	,,	750–500			
		60	1·99	33·91	27·12	,,	1000–750	—	1855	
		80	1·19	33·99	27·24	**N 100 B**	190–0	**2117**	**2137**	KT
		100	0·56	34·12	27·39					
		150	0·85	34·20	27·43					
		200	1·05	34·28	27·48					
		300	1·52	34·43	27·57					
		400	1·76	34·49	27·60					
		600	1·97	34·61	27·68					
		800	1·89	34·66	27·73					
		1000	1·73	34·66	27·74					
		1500	1·32	34·71	27·81					
		2000	0·91	34·70	27·83					
		2500	0·57	34·70	27·85					
		3000	0·32	34·68	27·85					
WS 573	6	0	2·13	33·83	27·05	**N 50 V**	100–0	**0127**		
		10	2·10	33·83	27·05	**N 70 V**	50–0			
		20	2·10	33·83	27·05	,,	100–50			
		30	2·09	33·83	27·05	,,	250–100			
		40	2·10	33·84	27·06	,,	500–250			
		50	2·10	33·84	27·06	,,	750–500			
		60	2·10	33·84	27·06	,,	1000–750	—	**0350**	
		80	1·14	33·91	27·18	**N 70 B**	124–0	0556	0616	KT
		100	0·57	33·96	27·26	**N 100 B**				
		150	0·16	34·25	27·51					
		200	0·61	34·28	27·51					
		300	1·54	34·45	27·59					
		400	1·66	34·55	27·66					
		600	1·80	34·61	27·70					
		800	1·76	34·67	27·75					
		1000	1·63	34·69	27·77					
		1500	1·21	34·71	27·82					
		2000	0·82	34·67	27·81					
		2500	0·50	34·68	27·84					
		3000	0·24	34·66	27·84					
WS 574	7	0	2·19	33·83	27·04	**N 50 V**	100–0	0635		
		10	2·18	33·83	27·04	**N 70 V**	50–0			
		20	2·18	33·83	27·04	,,	100–50			
		30	2·18	33·83	27·04	,,	250–80			
		40	2·17	33·83	27·04	,,	250–105			
		50	2·17	33·83	27·04	,,	500–250			
		60	2·17	33·83	27·04	,,	750–500			
		80	1·21	33·87	27·15	,,	1000–750	—	0930	
		100	−0·31	34·03	27·36	**N 70 B**	103–0	1156	1215	KT
		150	0·21	34·21	27·48	**N 100 B**				
		200	0·60	34·30	27·53					
		300	1·55	34·47	27·60					
		400	1·85	34·54	27·64					
		600	1·93	34·63	27·70					
		800	1·78	34·66	27·74					
		1000	1·66	34·72	27·79					

Station	Position	Date	Hour	Sounding (metres)	WIND Direction	WIND Force	SEA Direction	SEA Force	Weather	Barometer (millibars)	Air Temp. °C. Dry bulb	Remarks
WS 574 *cont.*	52° 48½′ S, 38° 04′ W	1931 26 iii										
WS 575	52° 35′ S, 38° 09′ W	26 iii	1420	—	NW	5	NW	7	b. c.	1003·6	4·4	WNW swell, force 6

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS				BIOLOGICAL OBSERVATIONS				Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	Gear	Depth (metres)	TIME From	TIME To	
WS 574 *cont.*	7	1500	1·31	34·72	27·82					
		2000	0·89	34·68	27·81					
		2500	0·59	34·68	27·83					
		3000	0·37	34·66	27·83					
WS 575	7	0	2·82	33·81	26·97	**N 50 V**	100–0	1420		
		10	2·81	33·82	26·98	**N 70 V**	50–0			
		20	2·81	33·82	26·98	,,	100–50			
		30	2·75	33·83	27·00	,,	250–100			
		40	2·68	33·83	27·00	,,	500–250			
		50	2·68	33·83	27·00	,,	750–500			
		60	2·50	33·83	27·02	,,	1000–720	—	1750	
		80	1·80	33·89	27·12	**N 70 B**	78–0	**1940**	**2000**	KT
		100	0·54	34·03	27·31	**N 100 B**				
		150	0·40	34·21	27·47					
		200	0·93	34·34	27·54					
		300	1·62	34·48	27·60					
		400	1·80	34·54	27·64					
		600	1·91	34·63	27·71					
		800	1·84	34·69	27·76					
		1000	1·69	34·71	27·79					
		1500	1·49	34·71	27·80					
		2000	1·03	34·69	27·81					
		2500	0·70	34·68	27·83					
		3000	0·45							

Station	Position	Date	Duration	Sounding (metres)	WIND		SEA		Weather
					Direction	Force	Direction	Force	
MS 83	3 cables N of Macmahon Rk, East Cumberland Bay, South Georgia	1930 10 xi	1540–1605	180	NW	2	NW	3	o.
MS 84	2 miles ESE of King Edward Pt, East Cumberland Bay, South Georgia	12 xi	1710–1808	164	SE	2	SE	2	o.
MS 85	Do. Do.	18 xi	1405–1512	—	ENE	2	E	1	b.
MS 86	Do. Do.	25 xi	1440–1542	164	ENE	3	NE	3	o.
MS 87	Do. Do.	2 xii	0956–1100	—	N	3	N	3	b. c.
MS 88	Do. Do.	10 xii	1450–1558	164	E	3	NE	3	f.
MS 89	Do. Do.	18 xii	1358–1454	—	E	3	NE	2	b. c.
MS 90	Do. Do.	24 xii	1046–1140	—	SE	2–3	SE	2	b. c.

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS		Remarks
		Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	Gear	Depth (metres)	
MS 83	19	0	0·99	32·56	26·11	8·02					
		5	0·24	32·97	26·48	8·02					
		50	−0·85	33·35	26·83	7·92					
MS 84	21	0	1·40	32·65	26·15	8·07	85	—	**N 50 V**	25–0	
		5	0·85	32·79	26·30	8·02	91				
		10	0·20	32·95	26·46	8·02	97				
		20	−0·39	33·19	26·68	8·02	99				
		30	−0·50	33·31	26·79	8·02	97				
		40	−0·70	33·33	26·81	7·97	98				
		50	−0·84	33·35	26·83	7·97	100				
		75	−0·88	33·35	26·83	7·97	109				
MS 85	27	0	2·40	33·12	26·46	8·07	89	8·22	**N 50 V**	25–0	
		5	1·02	33·26	26·67	8·07	87	8·18			
		10	0·00	33·26	26·72	8·02	87	8·19			
		20	−0·30	33·28	26·75	8·02	91	8·00			
		30	−0·43	33·30	26·77	8·02	93				
		40	−0·48	33·30	26·78	7·97	97	7·99			
		50	−0·60	33·30	26·78	7·97	105	7·94			
		75	−0·80	33·44	26·90	7·97	104	7·85			
MS 86	5	0	2·10	33·22	26·56	8·07	88	7·92	**N 50 V**	25–0	
		5	1·54	33·22	26·60	8·07	88	7·89	,,	50–0	
		10	−0·20	33·42	26·86	8·07	90	7·87			
		20	−0·30	33·51	26·94	8·02	91	7·78			
		30	−0·40	33·55	26·97	8·02	100	7·69			
		40	−0·40	33·58	27·00	7·97	112	7·57			
		50	−0·55	33·58	27·01	7·97	111	7·57			
		75	−0·70	33·62	27·04	7·97	110	7·50			
MS 87	12	0	0·90	33·06	26·51	8·07	84	7·92	**N 50 V**	25–0	much glacier ice
		5	0·60	33·26	26·69	8·07	85	7·90			
		10	0·40	33·49	26·89	8·07	86	7·79			
		20	0·00	33·57	26·97	8·07	85	7·71			
		30	0·00	33·62	27·01	8·02	86	7·71			
		40	−0·07	33·62	27·02	8·02	86	7·65			
		50	−0·20	33·62	27·02	8·02	90	7·60			
		75	−0·45	33·69	27·09	8·00	93	7·63			
MS 88	19	0	2·75	32·63	26·04	8·07	72	7·89	**N 50 V**	25–0	
		5	1·05	32·79	26·29	8·07	79	7·90	,,	50–0	
		10	0·45	33·24	26·68	8·07	84	7·90			
		20	−0·15	33·58	26·99	8·07	94	7·86			
		30	−0·10	33·62	27·02	8·02	89	7·84			
		40	−0·10	33·62	27·02	8·02	92	7·82			
		50	−0·15	33·62	27·02	8·02	92	7·81			
		75	−0·45	33·68	27·08	8·00	95	7·77			
MS 89	28	0	2·50	32·63	26·06	8·07	74	7·92	**N 50 V**	25–0	
		5	1·50	32·72	26·20	8·07	75	7·76	,,	50–0	
		10	0·50	32·99	26·48	8·07	78	7·69			
		20	0·20	33·66	27·03	8·07	79	7·68			
		30	0·10	33·87	27·21	8·07	80	7·57			
		40	0·05	33·87	27·21	8·07	78	7·52			
		50	0·00	33·87	27·22	8·02	82	7·45			
		75	−0·15	33·96	27·30	8·02	83	6·98			
MS 90	4	0	1·30	31·78	25·47	8·07	70	7·67	**N 50 V**	25–0	
		5	0·90	33·15	26·59	8·07	72	7·64	,,	50–0	
		10	0·85	33·24	26·66	8·07	74				
		20	0·60	33·39	26·80	8·07	79				

Station	Position	Date	Duration	Sounding (metres)	WIND		SEA		Weather
					Direction	Force	Direction	Force	
MS 90 *cont.*	2 miles ESE of King Edward Pt, East Cumberland Bay, South Georgia	1930 24 xii							
MS 91	Do. Do.	31 xii	1404– 1450	—	NNW	3	N	3	o. s. q.
MS 92	Do. Do.	1931 8 i	1045– 1144	—	NE	1	—	0	b.
MS 93	2 cables ESE of Discovery Pt, East Cumberland Bay, South Georgia	8 i	1225– 1334	2 17	NNE	1–2	—	0	b. c.
MS 94	Moränen Fjord, South Georgia: Mount Duse N 5° E, Merton Rock N 60° E	8 i	1425– 1550	73	NNE	2–3	—	0	b. c.
MS 95	2 miles ESE of King Edward Pt, East Cumberland Bay, South Georgia	15 i	1120– 1210	164	NNE	3	NNE	3	c.
MS 96	Moränen Fjord, South Georgia: 2 cables NE of N edge of Hamberg glacier face	15 i	1600– 1615	146	NNE	3–4	—	0	o.
MS 97	2 miles ESE of King Edward Pt, East Cumberland Bay, South Georgia	22 i	1010– 1114	164	N	3	N	3	o.
MS 98	Do. Do.	29 i	1435– 1530	—	N	3	N	3	b. c.

Station	Age of moon (days)	Hydrological observations: Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mgm. p.m.³	O_2 cc. p. l.	Biological observations: Gear	Depth (metres)	Remarks
MS 90 *cont.*	4	30	0·60	33·51	26·89	8·02	80				
		40	0·50	33·51	26·90	8·02	81				
		50	0·40	33·51	26·90	8·02	83				
		75	0·20	33·51	26·91	8·02	87	6·94			
MS 91	12	0	1·45	33·30	26·67	8·07	71	7·66	N 50 V	25–0	
		5	1·20	33·30	26·69	8·02	71	7·61			
		10	0·80	33·30	26·71	8·02	71	7·61			
		20	0·70	33·33	26·74	8·02	72	7·61			
		30	0·60	33·40	26·81	8·02	73	7·61			
		40	0·55	33·73	27·07	8·02	73	7·52			
		50	0·50	33·73	27·08	8·02	78	7·45			
		75	0·40	33·73	27·08	8·02	79	7·15			
MS 92	19	0	2·40	33·08	26·43	8·12	72	7·49	N 50 V	25–0	some glacier ice
		5	1·25	33·33	26·71	8·07	75	7·45	,,	50–0	
		10	1·10	33·64	26·97	8·07	79	7·45			
		20	1·10	33·64	26·97	8·07	84	7·45			
		30	0·90	33·77	27·08	8·02	84	7·40			
		40	0·40	33·77	27·11	8·02	86	7·40			
		50	0·40	33·82	27·15	8·02	91	7·37			
		75	0·30	33·82	27·16	7·97	91	7·20			
MS 93	19	0	2·40	32·01	25·57	—	—	—	—	—	surface samples on ebb tide
		0	3·05	31·94	25·47						
MS 94	19	0	1·70	30·88	24·72	8·22	54	8·07	N 50 V	36–0	much glacier ice moored to growler
		5	1·25	31·98	25·63	8·17	54	—	,,	50–0	
		10	0·95	32·38	25·95	8·12	56				
		20	1·10	32·77	26·27	8·12	65	7·47			
		30	1·00	33·12	26·55	8·12	86				
		40	0·30	33·12	26·59	8·02	96	7·26			
		50	0·00	33·39	26·83	7·97	99				
		75	−0·45	33·48	26·92	7·97	100	6·45			
MS 95	26	0	1·50	33·58	26·89	8·12	83	7·56	N 50 V	25–0	
		5	1·30	33·60	26·92	8·07	85	7·54	,,	50–0	
		10	0·95	33·69	27·02	8·07	86	7·49			
		20	0·80	33·73	27·06	8·07	89	7·50			
		30	0·70	33·91	27·21	8·07	91	7·52			
		40	0·65	33·91	27·21	8·02	91	7·46			
		50	0·60	33·93	27·23	8·02	91	7·30			
		75	0·50	33·93	27·24	8·02	94	6·76			
MS 96	26	0	1·95	31·65	25·32	8·32	58	8·05	—	—	much glacier ice; moored to growler
		100	−0·65	33·68	27·09	7·92	129	6·05			
MS 97	3	0	2·90	32·56	25·97	8·07	51	8·09	N 50 V	25–0	
		5	1·60	32·77	26·24	8·07	63	7·67	,,	50–0	
		10	1·60	33·48	26·81	8·07	71	7·68			
		20	1·60	33·69	26·97	8·07	74	7·45			
		30	1·43	33·86	27·12	8·07	82	7·45			
		40	1·30	33·86	27·13	8·07	85	6·97			
		50	0·91	33·86	27·16	8·02	97	7·05			
		75	0·80	34·00	27·27	8·02	102	6·87			
MS 98	10	0	2·50	32·25	25·75	8·07	83	7·87	N 50 V	25–0	
		5	1·80	33·64	26·92	8·07	85	7·42	,,	50–0	
		10	1·70	33·69	26·97	8·07	86	7·46			
		20	1·55	33·75	27·02	8·07	87	7·44			

Station	Position	Date	Duration	Sounding (metres)	WIND		SEA		Weather
					Direction	Force	Direction	Force	
MS 98 *cont.*	2 miles ESE of King Edward Pt, East Cumberland Bay, South Georgia	1931 29 i							
MS 99	Do. Do.	5 ii	1330–1425	164	N	3	N	3	c.
MS 100	Do. Do.	12 ii	0952–1049	—	SE	3	N	4	o.
MS 101	Do. Do.	19 ii	1045–1140	—	E	2	N	2	o. s.
MS 102	Do. Do.	26 ii	1105–1220	—	—	—	N	5	r. f.
MS 103	Do. Do.	5 iii	1025–1130	164	SE	4	N	4	b. c.
MS 104	Do. Do.	12 iii	1025–1120	—	SE	2	N	3	b. c.
MS 105	Do. Do.	19 iii	1025–1120	—	NNE	2	N	3	b. c.

Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS							BIOLOGICAL OBSERVATIONS		Remarks
		Depth (metres)	Temp. C.	S ‰	σt	pH	P_2O_5 mgm. p.m.^{3}	O_2 cc. p. l.	Gear	Depth (metres)	
MS 98 *cont.*	10	30	1·42	33·80	27·07	8·07	91	7·40			
		40	1·10	33·86	27·14	8·07	91	7·37			
		50	0·86	33·87	27·17	8·07	94	7·19			
		75	0·42	33·87	27·19	8·07	93	7·17			
MS 99	17	0	2·85	32·66	26·05	8·12	84	7·87	N 50 V	25–0	
		5	2·20	33·31	26·62	8·12	86	7·42	,,	50–0	
		10	2·15	33·51	26·79	8·07	89	7·46			
		20	1·95	33·51	26·80	8·07	90	7·44			
		30	1·80	33·60	26·89	8·07	93	7·40			
		40	1·60	33·66	26·95	8·07	93	7·37			
		50	1·42	33·66	26·96	8·07	95	7·19			
		75	0·95	33·66	26·99	8·02	99	7·17			
MS 100	24	0	2·25	32·14	25·69	8·12	75	7·63	N 50 V	25–0	
		5	2·60	32·65	26·23	8·07	76	7·51	,,	50–0	
		10	2·05	33·40	26·71	8·07	79	7·37			
		20	1·90	33·55	26·84	8·07	81	7·39			
		30	1·60	33·64	26·93	8·07	83	7·40			
		40	1·40	33·64	26·95	8·02	86	7·35			
		50	1·30	33·75	27·04	8·02	86	7·37			
		75	1·00	33·75	27·06	8·02	106	7·36			
MS 101	1	0	2·20	32·68	26·12	8·12	73	7·77	N 50 V	25–0	
		5	1·80	33·48	26·79	8·12	85	7·49	,,	50–0	
		10	1·70	33·84	27·09	8·12	81	7·47			
		20	1·50	33·84	27·10	8·12	89	7·42			
		30	1·95	33·89	27·11	8·09	91	7·42			
		40	1·85	33·89	27·12	8·09	93	7·39			
		50	1·80	33·89	27·12	8·07	94	7·43			
		75	1·45	33·89	27·15	8·07	100	7·40			
MS 102	8	0	1·87	31·06	24·85	8·07	73	7·54	N 50 V	25–0	v. heavy N swell
		5	1·87	32·57	26·05	8·07	83	7·39	,,	50–0	
		10	1·80	32·86	26·30	8·07	82	7·36			
		20	1·80	32·86	26·30	8·07	83	7·36			
		30	1·50	32·86	26·32	8·07	83	7·34			
		40	1·35	32·90	26·36	8·07	84	7·27			
		50	1·30	32·90	26·36	8·07	88	7·28			
		75	0·70	32·92	26·41	8·07	89	7·04			
MS 103	15	0	2·60	31·49	25·14	8·07	77	7·43	N 50 V	25–0	heavy N swell
		5	2·00	32·77	26·21	8·02	80	7·40	,,	50–0	
		10	1·80	33·06	26·45	8·02	82	7·27			
		20	1·84	33·06	26·45	8·07	85	7·27			
		30	1·85	33·12	26·50	8·07	89	7·25			
		40	1·80	33·12	26·50	8·07	91	7·25			
		50	1·70	33·12	26·51	8·07	93	7·22			
		75	1·00	33·12	26·56	8·07	101	7·23			
MS 104	22	0	2·10	31·80	25·43	8·07	82	7·47	N 50 V	25–0	N swell
		5	1·90	32·57	26·05	8·07	82	7·46	,,	50–0	
		10	1·90	33·01	26·41	8·07	87	7·37			
		20	1·95	33·01	26·41	8·07	88	7·37			
		30	1·80	33·06	26·46	8·07	90	7·36			
		40	1·70	33·10	26·49	8·07	91	7·29			
		50	1·70	33·10	26·49	8·02	91	7·24			
		75	1·55	33·10	26·50	8·02	96	7·23			
MS 105	29	0	0·60	31·35	25·16	8·02	85	7·43	N 50 V	25–0	much glacier ice
		5	1·85	32·86	26·29	8·07	88	7·34	,,	50–0	N swell
		10	1·95	32·95	26·36	8·07	89	7·34			

Station	Position	Date	Duration	Sounding (metres)	WIND		SEA		Weather
					Direction	Force	Direction	Force	
MS 105 *cont.*	2 miles ESE of King Edward Pt, East Cumberland Bay, South Georgia	1931 19 iii							
MS 106	Do. Do.	29 iii	1355–1500	—	NNW	5	N	5	b. c.

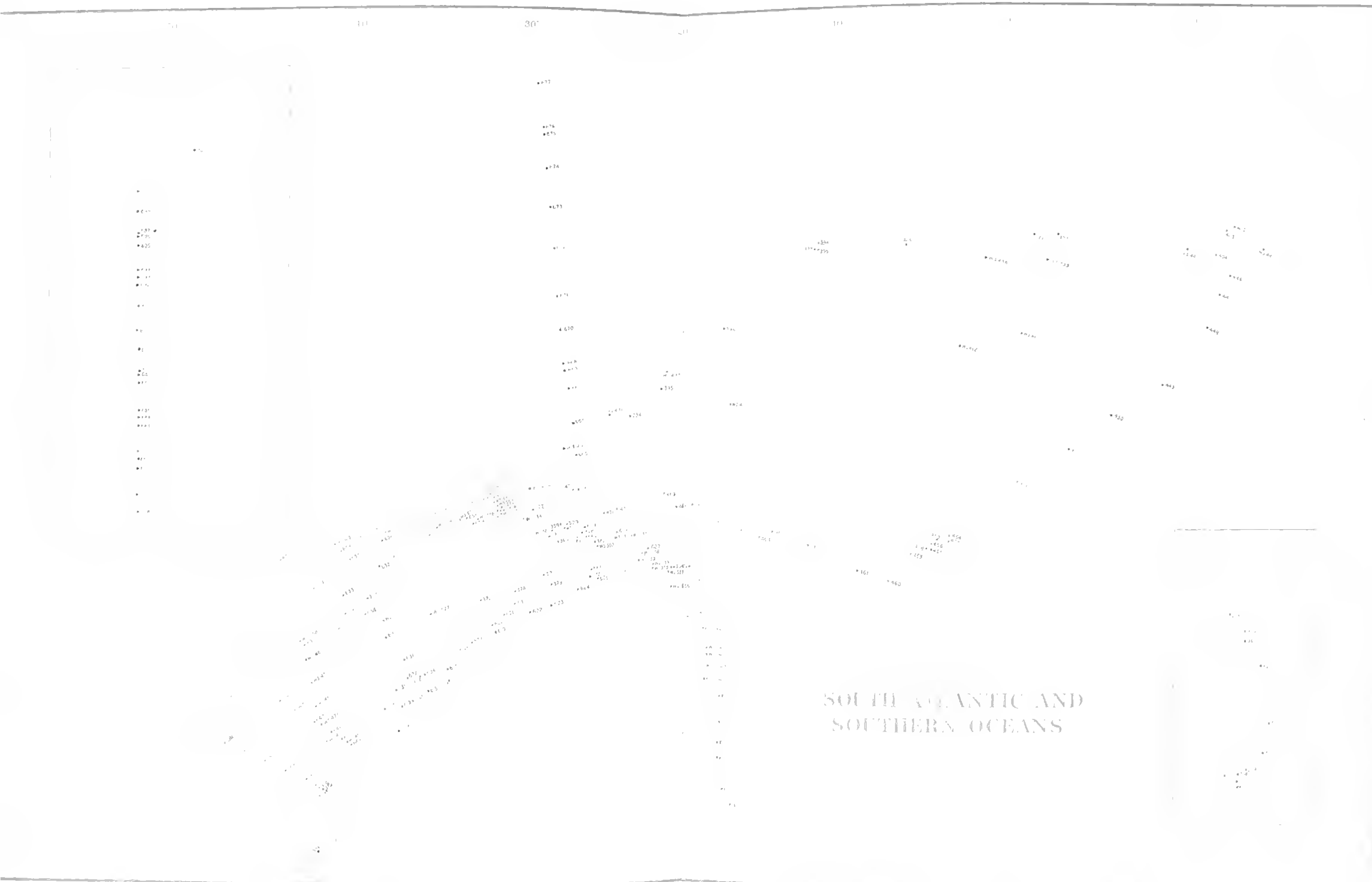
Station	Age of moon (days)	HYDROLOGICAL OBSERVATIONS Depth (metres)	Temp. °C.	S ‰	σt	pH	P_2O_5 mg.m. mp.^{3}	O_2 cc. p. l.	BIOLOGICAL OBSERVATIONS Gear	Depth (metres)	Remarks
MS 105 *cont.*	29	20	1·90	33·57	26·86	8·07	90	7·20			
		30	1·85	33·57	26·86	8·07	90	7·21			
		40	1·85	33·57	26·86	8·07	91	7·19			
		50	1·85	33·60	26·89	8·07	92	7·15			
		75	1·55	33·66	26·96	8·02	93	7·03			
MS 106	9	0	2·05	32·59	26·06	8·07	86	7·30	**N 50 V**	25–0	heavy N swell and sea
		5	2·00	32·63	26·10	8·07	87	7·24	,,	50–0	
		10	1·72	33·31	26·66	8·02	89	7·15			
		20	1·70	33·49	26·81	8·02	88	7·12			
		30	1·70	33·57	26·87	8·02	84	7·09			
		40	1·70	33·60	26·89	8·02	90	7·07			
		50	1·40	33·60	26·92	8·02	90	7·03			
		75	1·10	33·62	26·98	8·02	96	7·02			

SUMMARIZED LIST OF STATIONS

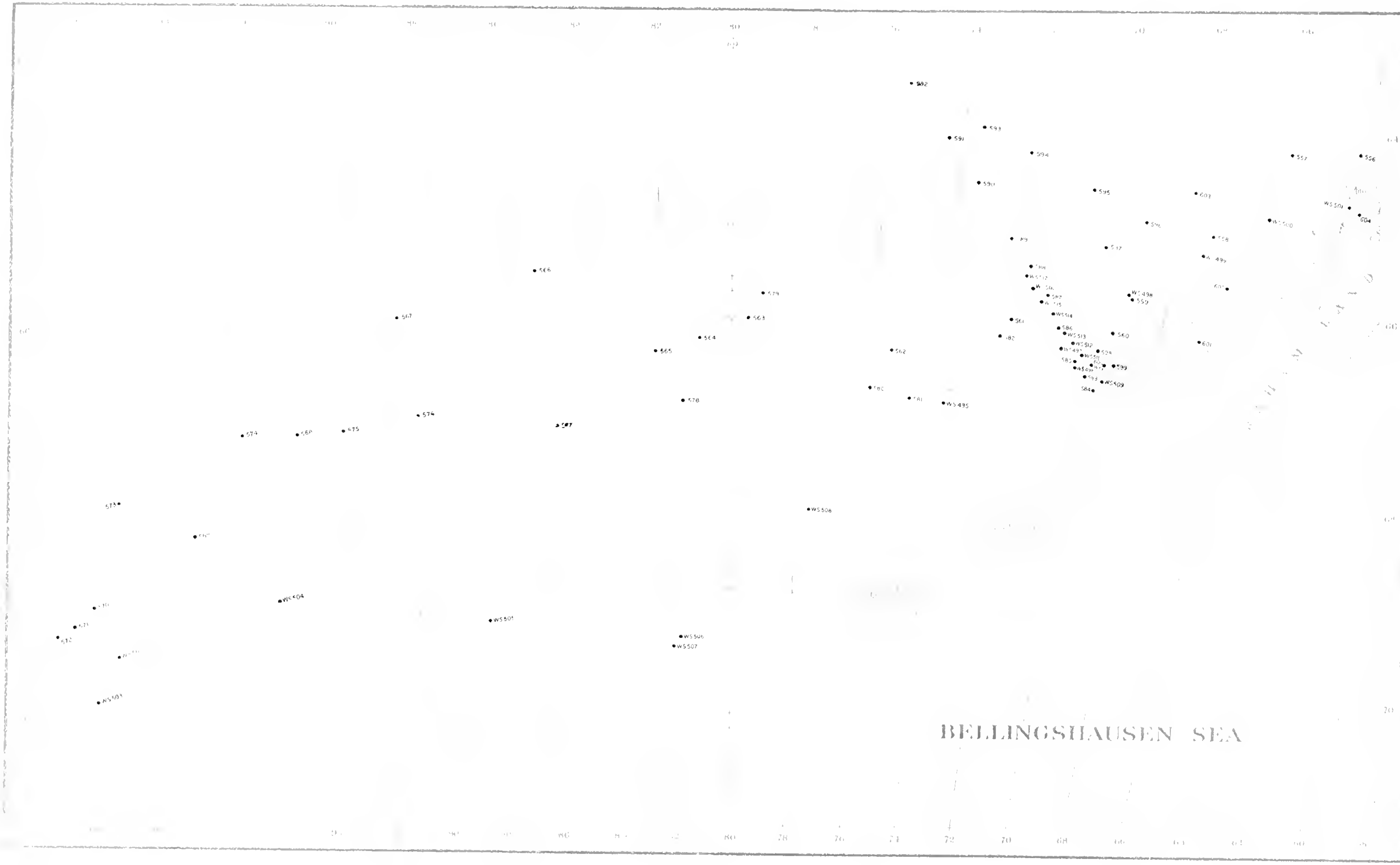
The positions of all stations made by the R.R.S. 'Discovery II' between January 1930 and May 1931 and the R.R.S. 'William Scoresby' between May 1929 and March 1931 are shown on the charts reproduced in Plates I–V. The following list indicates on which chart each of the stations is to be found.

Station	Date	Place	Plate
		R.R.S. 'DISCOVERY II'	
300–358	20. i.–11. ii. 30	South Georgia	IV
359–362	24–25. ii. 30	South Georgia—South Sandwich	I
363–371	26. ii.–14. iii. 30	South Sandwich	I (inset)
372–375	18–21. iii. 30	South Sandwich—South Shetlands	I
376–377	11–12. iv. 30	South Shetlands	III
378–392	13–18. iv. 30	South Shetlands—Cape Horn—South Georgia	I
393	7–8. v. 30	South Georgia	IV
394–405	12. v.–4. vi. 30	South Georgia—Gough Island—Cape Town	I
403–450	24. v.–13. x. 30	South Africa	V
446–472	9. x.–1. xi. 30	Cape Town—Bouvet Island—South Georgia	I
473–526	3. xi.–10. xii. 30	South Georgia	IV & inset
527–536	11–18. xii. 30	South Georgia—South Shetlands	I
537–555	19–28. xii. 30	South Shetlands	III
556–604	28. xii. 30–25. i. 31	South Shetlands—Bellingshausen Sea	II
605–612	26. i.–10. ii. 31	South Shetlands	III
613–629	12–15. ii. 30	South Shetlands—South Sandwich—South Georgia	I & inset
630–639	3–9. iii. 31	South Georgia—South Orkneys	I
640–644	10–11. iii. 31	South Shetlands	III
644–659	11–26. iii. 31	South Shetlands—Cape Horn—South Georgia	I
660	31. iii. 31	South Georgia	IV (inset)
661–663	2–5. iv. 31	South Sandwich	I
664	15. iv. 31	South Georgia	IV (inset)
665–700	17. iv.–18. v. 31	South Georgia—Cape Verde Islands	I & inset
		R.R.S. 'WILLIAM SCORESBY'	
WS 434–441	18–30. v. 29	South Georgia—South Africa	I
WS 442–460	21. vi.–12. ix. 29	South Africa	V
WS 461–474	15. x.–13. xi. 29	Cape Town—South Georgia—Falkland Islands—South Orkneys	I
WS 475–494	14–28. xi. 29	South Shetlands	III
WS 495–517	22. xii. 29–12. ii. 30	South Shetlands—Bellingshausen Sea	II
WS 518–532	27. ii. 30–10. i. 31	Between Falkland Islands and South Sandwich	I
WS 533	22. i. 31	South Georgia	IV (inset)
WS 534–561	22. i.–10. ii. 31	South Georgia	I
WS 562, 564–566	11. ii.–4. iii. 31	South Georgia	IV & inset
WS 567–570	6–8. iii. 31	South Georgia	I
WS 571	19. iii. 31	South Georgia	IV (inset)
WS 572–575	24–26. iii. 31	South Georgia	I

PLATES I—V



30°
SOUTH ATLANTIC AND
SOUTHERN OCEANS


BELLINGSHAUSEN SEA
592
593
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WS 500
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WS 513
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WS 507
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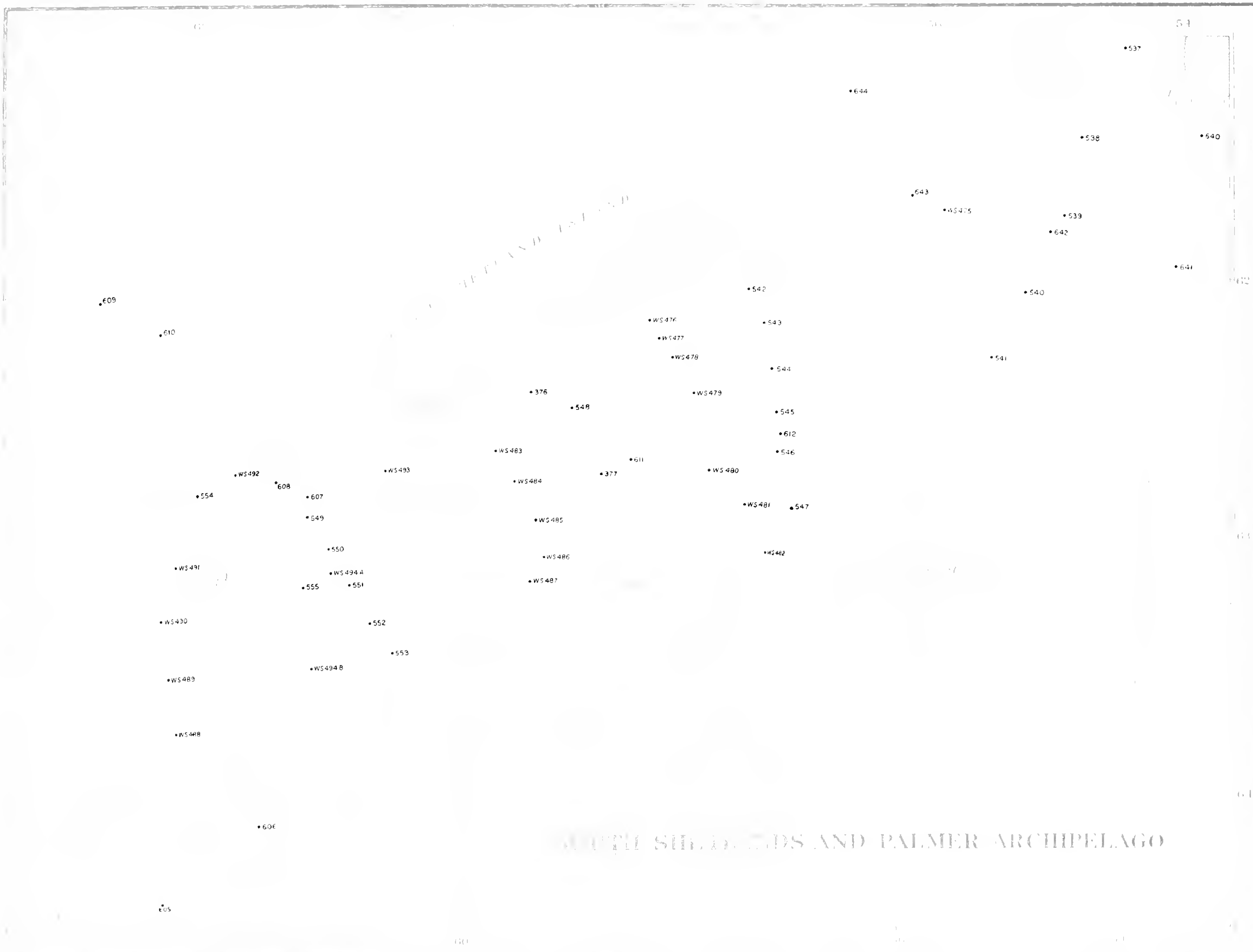
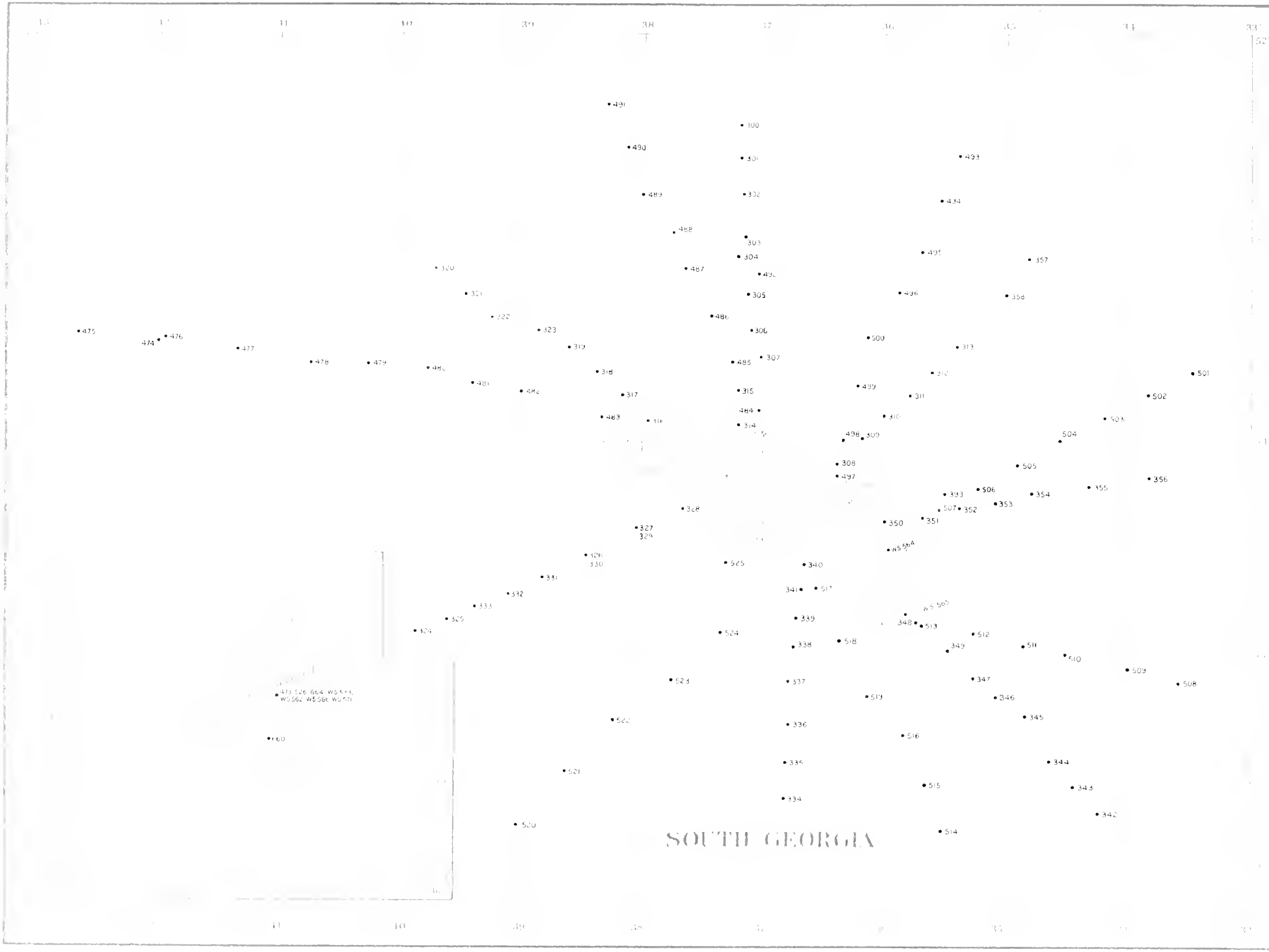
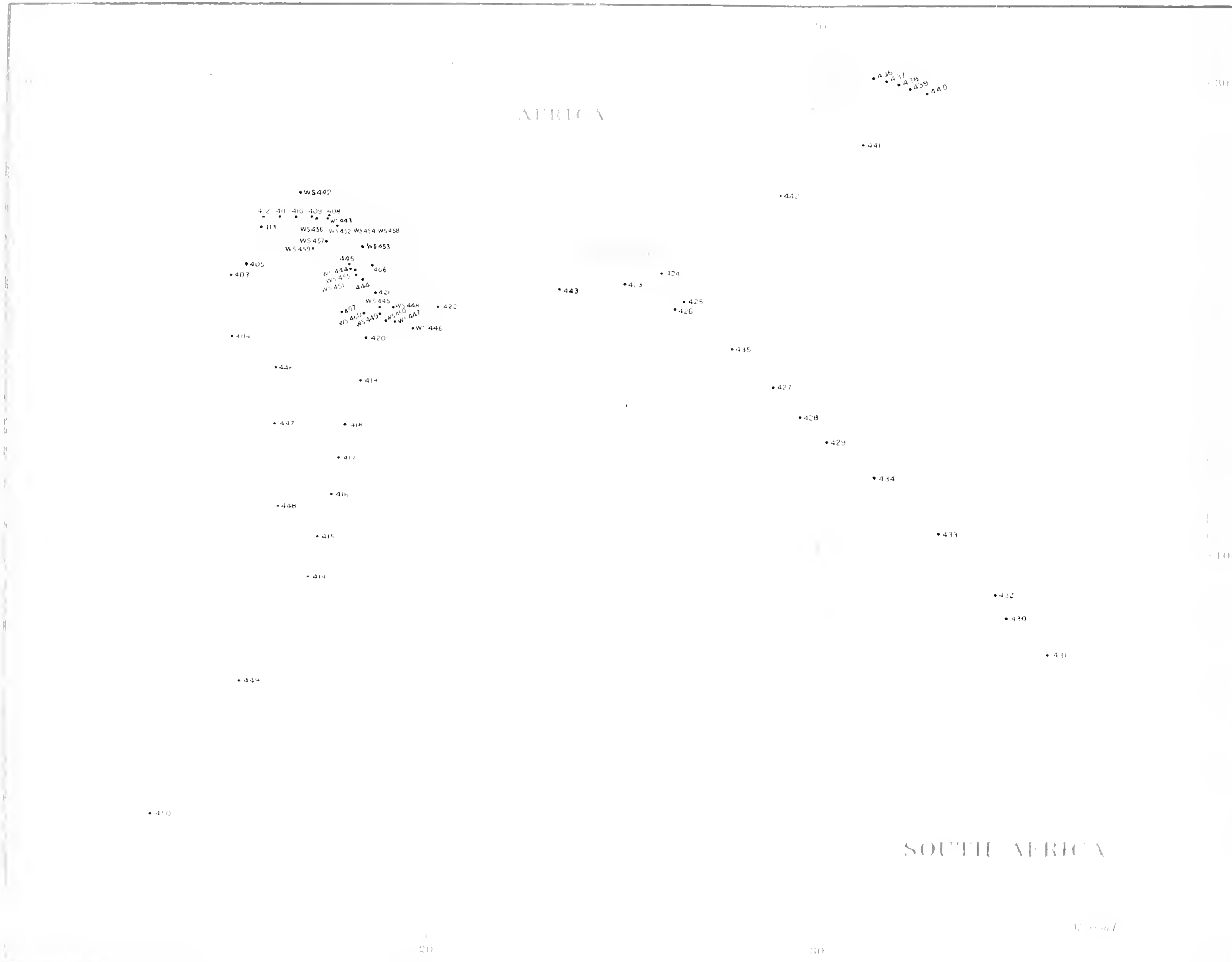
WS 503



SOUTH SHETLAND ISLANDS AND PALMER ARCHIPELAGO


SOUTH GEORGIA


AFRICA
SOUTH AFRICA
WS442
WS453
443
434
433

[*Discovery Reports. Vol. IV, pp.* 233–264, *May*, 1932]

OLIGOCHAETA

PART I. MICRODRILI (mainly ENCHYTRAEIDAE)

By

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OLIGOCHAETA

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INTRODUCTION

THE Microdrili in the present collection have been obtained from four localities: the Palmer Archipelago, almost directly south of Cape Horn, near Graham Land, between 64° and 65° S lat.; the South Orkneys, between Graham Land and South Georgia, in S lat. 60–61°; South Georgia, approximately in S lat. 54–55° and W long. 38°; and Gough Island, in the middle of the South Atlantic, somewhat to the south-east of Tristan d'Acunha, in S lat. 40°. These places are more or less in line with each other, the line stretching from south-west to north-east, from the Palmer Archipelago to Gough Island; but Gough Island is at a considerably greater distance from the other localities than these are from each other.

Apparently no Microdrili have previously been collected in the Palmer Archipelago, the South Orkneys, or on Gough Island; but from South Georgia we possess the records of Michaelsen (1888) and Michaelsen (1905) (*Hesperodrilus crozetensis*, *Rhyacodrilus coccineus*, *Marionina georgiana*, *M. exigua*, *Lumbricillus maximus*, *Enchytraeus albidus*, *Michaelsena monochaeta*). While *Marionina exigua*, *Rhyacodrilus coccineus*, and (apparently) *Hesperodrilus crozetensis* have not been recovered by the present expedition, the tubes from South Georgia contain the other species previously found there, and in addition *Marionina aestuum*, sp.n., *Lumbricillus antarcticus*, sp.n., *L. macquariensis* (known previously from the sub-Antarctic islands of New Zealand), *Enchytraeus australis*, sp.n., *E. colpites*, sp.n., a probably undescribed species of *Hesperodrilus*, and an indeterminable specimen belonging to the genus *Achaeta*.

My best thanks are due to the authorities of the British Museum (Natural History), where my investigations were carried out, for the facilities so kindly afforded me. All the specimens, including types of the new species, are now in the Museum.

GEOGRAPHICAL DISTRIBUTION

The facts of distribution of the earthworms (Megadrili) of the sub-Antarctic islands are of interest as contributing to a discussion of the problem of an Antarctic Continent and its former connections as a factor in zoogeography. The problem has been argued, principally by Michaelsen and Benham, on the basis of the present-day distribution of the acanthodriline genus *Microscolex*; and I have recently (Stephenson, 1930) given an outline of their arguments, with references to their papers. Briefly, Benham sees the

present distribution of species of *Microscolex* in southern and sub-Antarctic islands, from the South American eastwards to the New Zealand region, as a result of the former existence of an Antarctic Continent with a temperate climate, with northward extensions which reached and included the scattered islands of the southern seas; while Michaelsen looks on this distribution as due to the dispersal across the ocean of the genus *Microscolex* (of which at least some species are littoral in habitat and euryhaline) from its home in the south of South America by the agency of the "west wind drift".

But it is generally recognized that the distribution of the smaller Oligochaeta (Microdrili), and especially of the freshwater and littoral genera, has little bearing on the larger questions of zoogeography. They are easily transported by human or other agency or by the inanimate forces of nature; and accordingly we see, for example, *Enchytraeus albidus*, one of the commonest worms of Europe, widely distributed in the islands of the southern seas (though apparently absent from the warmer regions of the globe). It is therefore mainly for the simple purpose of completing our survey that I add here the following notes on distribution.

Of the worms brought back by the present expedition *Marionina grisea*, *M. aestuum*, *Lumbricillus antarcticus*, *Enchytraeus colpites*, and *Michaelsena monochaeta* have each been found only in a single locality (*M. monochaeta* in the same locality also by a previous expedition).

The genus *Hesperodrilus* (fam. Phreodrilidae), represented in the present collection by an example from South Georgia which is specifically indeterminable, is known from Tierra del Fuego, South Chile, South Georgia, the Crozets, Kerguelen Island, Campbell Island, New Zealand, and New South Wales.

The genus *Achaeta* (this and the following genera belong to the Enchytraeidae), of which an indeterminable example was taken in South Georgia, is also known from Europe and New Zealand.

Marionina grisea and *M. aestuum*, though I consider them as specifically distinct, form with *M. werthi* and *M. benhami* (cf. p. 250) a closely interrelated group, the species of which stretch in a line from the Palmer Archipelago (*grisea*) through South Georgia (*aestuum*) and Kerguelen (*werthi*) to Macquarie Island in the New Zealand region (*benhami*), half-way round the globe.

Marionina georgiana has been found, by the present or by previous expeditions, in South Georgia, the Falkland Islands, and the Crozets.

Lumbricillus lineatus (a common European species) in the Palmer Archipelago, the South Orkneys (between the last-mentioned locality and the next), and (with some element of doubt) South Georgia, as well as in Tierra del Fuego.

L. maximus in the Palmer Archipelago, the South Orkneys, South Georgia, the Crozets, and (var. *Robinson*) New Amsterdam Island, in the South of the Indian Ocean.

L. macquariensis in South Georgia and in the New Zealand region (Macquarie, Auckland, and Campbell Islands), but not hitherto in any of the islands between.

Enchytraeus albidus (common in the northern hemisphere) in Southern Patagonia,

Tierra del Fuego, the Falkland Islands, South Georgia, Kerguelen, the Crozets, and the southern islands of the New Zealand region.

E. australis in South Georgia and Gough Island (in mid-Atlantic, not far from Tristan d'Acunha).

All the above genera of Enchytraeidae are known from Europe, and *Marionina*, *Lumbricillus*, and *Enchytraeus*, which are among the commonest representatives of the family, from North America also.

Though *Rhyacodrilus coccineus* (Tubificidae), recorded from South Georgia by Michaelsen (1905), was not obtained by the present expedition, it is interesting to note that it occurs in Europe, in the Crozets (Michaelsen, 1905 *a*), and in New Zealand (= *Taupodrilus simplex*, Benham, 1903).

Though the above presentation contains some rather striking facts, such as the occurrence of *Lumbricillus macquariensis* only in the widely separated localities of South Georgia and the southern islands of the New Zealand region, and similarly of *Enchytraeus australis* only in South Georgia and Gough Island, it can, owing to the ease with which these worms or their cocoons can be transported, hardly be said to contribute data of much value for zoogeographical discussion. We cannot rule out transport by human agency or by natural forces; though, of course, while the facts give no support to the view of a recent temperate Antarctica as a factor in zoological distribution, they are at least not against it.

DEGENERATION OF THE INTERNAL ORGANS IN THE ENCHYTRAEIDAE

In a number of the worms in the present collection the task of identification and description was rendered difficult or even (as in the specimen belonging to the genus *Achaeta*) impossible by a marked degeneration of the interior of the animal.

This condition was very common in the numerous specimens of *Lumbricillus maximus*, the most abundantly represented species in the collection; in most of the batches some, it might be even all, of the worms showed the change. In the body wall the muscular layers were breaking up, the longitudinal muscle coat was losing its continuity and its cohesion, small lengths of muscle fibres were being shed and a number of such fragments were loose in the anterior segments, where they were apparently becoming converted into a homogeneous somewhat waxy-looking substance. Some of the lymph corpuscles were vacuolated, and many were disintegrating.

The alimentary canal shows the degenerative changes in a very marked degree. The pharynx breaks up with the formation of vacuolar spaces, and the setting free of small round or irregular cells and non-nucleated fragments. The cells of the alimentary epithelium are shed into the cavity; in the preclitellar segments the oesophagus is seen to have lost the whole of its epithelial lining, and its lumen is full of small irregular cells and granular debris; behind segment 14 there is a regular epithelial layer, which here and there is becoming detached but is still continuous.

The chloragogen cells become greatly elongated, more than 100μ high, and vacuolated, the vacuoles constituting the greater part of the cell, and arranged either in a single series along its length or in more than one series.

In the spermathecae the epithelium is shed as a still more or less connected layer, the wall of the organ being reduced to a thin membrane.

In the final stages of degeneration the external annulation is lost, and in the worms cleared for microscopic examination no internal structure is visible, except that sometimes the alimentary canal is still distinguishable, with some of the ova, and traces of the spermathecae.

Among the specimens of *Marionina georgiana*, the only one which was fully mature was not degenerate, and was well preserved in every way. Another example, only in the early stage of sexual maturity, with none of the sexual organs fully formed, showed changes in the alimentary canal—the intestinal epithelium behind the clitellum was loosening itself from the substratum and beginning to disintegrate; in the body-wall the muscular layer had for the most part become homogeneous and waxy-looking; and a dense fibrous coagulum was seen in places in the body-cavity, applied to the chloragogen layer of the gut.

In the specimens of *Michaelsena monochaeta* I found the genital segments and those behind them in a curious condition. There was little free space in the segments, which were filled by a mass of cells and cell degenerations, but with no free spermatozoa or stainable male cells at any stage, and no ova; this filling out with degenerating masses was continued backwards to segment 20, beyond which my sections did not go. In a specimen in which this condition was carried to an extreme, it was noted that the alimentary canal was not much altered, the heavy ciliation of the lining epithelium being preserved.

The single example of the genus *Achaeta* was much disorganized internally; both the alimentary canal and the interior of the genital segments were in a very degenerate state.

The appearances described above do not seem to be due to bad fixation; the specimens of *Lumbricillus maximus*, in which degeneration is most frequent, have been fixed with great care, so as to preserve them in an extended condition, which naturally greatly facilitates examination and sectioning; indeed the same holds for most of the worms in the collection. Speaking generally, even if small worms such as these Enchytraeids were merely thrown promiscuously into spirit, we should get sections which were perfectly usable for morphological purposes (though the worms would doubtless be very inconveniently bent and twisted). Moreover, some specimens of a batch may be degenerate, others not so (e.g. in the case of *Marionina georgiana*). The only supposition by which bad fixation could be held responsible for the appearances would be that the worms were already dead and beginning to disintegrate before being taken for fixation; but this I am sure we can exclude.

I have previously recorded (1926) a not very dissimilar degenerative phenomenon in Enchytraeids, and curiously, there also in worms from a frigid region—Arctic, however, not Antarctic (Spitsbergen). In them I frequently found a wholesale degeneration and shedding of the alimentary epithelium, sometimes with overgrowth of the chloragogen

layer (compare the description of *Lumbricillus maximus* above). I was there inclined to ascribe the appearances to excessive parasitization of the alimentary canal, though I had to confess that in some specimens of extreme degeneration there was no evident parasitization.

Yet more recently I have again come across examples of degeneration in Enchytraeids; some small worms belonging to the genus *Lumbricillus* sent to me from Plymouth by Mr J. S. Colman proved to be specifically indeterminable, owing to a wholesale degeneration of the organs—not the genital organs only, nor the alimentary canal only. Specimens that I have since received from Mr Colman, at a different time of the year, have given me no trouble, and I hope shortly to describe them as a new species, *L. pumilio*. I think the condition here is probably a post-maturity degeneration (*v. infra*)—which, however, has spread beyond the genital organs and affected the whole body.

Mrázek (1910) found that after keeping for some time in unfavourable conditions, Tubificids showed in the coelomic cavity what he took to be portions of the longitudinal muscular layer, sometimes in large amount, so that the coelom was full of this material; the fragments are sometimes engulfed by the amoebocytes of the cavity. The genital organs were degenerating at the same time, but Mrázek does not connect the two degenerations.

I might also recall the fact that in the Naididae there is sometimes a degeneration of the alimentary tract at the height of sexual maturity (in the genera *Nais*, *Dero*, *Haemonais*; cf. Stephenson, 1930, p. 131, and references there); but in these worms the other organs are intact.

I think my first acquaintance with these degenerations was many years ago, when I was working in India, and received from Burma, through the Indian Museum, a number of Enchytraeids which had been found attacking rice, burying themselves in and living in the shoots; an identification was therefore of some economic interest. However, I was unable to say anything, except to make a request for more material, taken, if possible, at a different time of the year. I subsequently received a second consignment; but here again the same condition was present, and I was unable to do anything with it. I have no doubt that the Agricultural Department, which sent the worms, thought I was a particularly incompetent worker.

That the genital organs of Oligochaetes undergo regression after the period of sexual maturity is well known; the changes include the production of large numbers of phagocytes, and the disappearance of the sexual organs by phagocytosis. That the spermatozoa remaining in the seminal vesicles or free in the testicular segments are ingested by phagocytes is familiar to us mainly from the work of Cognetti (1911, 1930) and Černosvitov (1930); for an account of the histological changes in the degenerating organs, and their disappearance by phagocytosis, we are dependent on Černosvitov (1930 *a*), who describes these processes in *Tubifex*.

To which of these forms of degeneration the phenomena described in the present paper are to be assimilated it is difficult to say. They can here hardly be due to parasiti-

zation; parasites (Anoplophryina) are not uncommon in the alimentary canal of these worms, but they do not occur in any extraordinary numbers, and the degree of parasitization would pass without comment if found in specimens of Enchytraeids from our own shores.

Are all the above-mentioned forms of degeneration at bottom one—a form which comes on at the end of life, which is sometimes introduced by (or is an extension of) the normal post-maturity degeneration of the genital organs, sometimes by the changes in the alimentary canal?

VARIATION IN FORM OF THE NEPHRIDIA IN THE ENCHYTRAEIDAE

In seeking for characters on which to base specific distinctions in the Enchytraeidae the form of the nephridia has been much used—e.g. the size of the anteseptal portion of the organ, which may consist of the funnel only, or may comprise more or less of the glandular part in addition; the shape of the postseptal; the length of the duct relatively to that of the postseptal; its direction—downwards, forwards, or backwards; and especially the place of origin of the duct—at the hinder end, or from some place on the under surface nearer or further from the hinder end.

I have previously (1922) drawn attention to the variability of some of these characters; and the following notes, made in the course of examining the sections (all longitudinal) of some of these worms, seem to confirm what I then wrote. The only really fixed feature of the nephridia seems to be the size of the anteseptal relatively to that of the postseptal portion.

In a specimen of *Lumbricillus maximus*, in one organ the duct left the hinder end of the postseptal and passed backwards and then downwards to the surface; in a neighbouring segment the duct left the under surface of the postseptal some distance in front of the hinder end, passing thence first forwards and then downwards and backwards. Similar variations in the place of origin of the duct are found in *Marionina aestuum* (see the description of this worm, *post*).

In *Enchytraeus albidus*, in consecutive preclitellar segments, the nephridial duct was seen in one to come off at the middle of the length of the nephridium, in the other from the hinder end; in other preclitellar segments it came off from the under surface in front of the hinder end—about one-third of the length of the postseptal from the hinder end; while behind the clitellum it left the postseptal at the posterior end. The duct may pass backwards, backwards and downwards, nearly directly downwards, or downwards and forwards, all in four consecutive segments.

The shape of the postseptal, as seen in sections, depends on the direction in which it is cut. It seems (in *L. maximus*) to be considerably flattened from above downwards, and hence appears broadly oval in a more or less frontal series, narrow and elongated in a sagittal series.

SYSTEMATIC

Family PHREODRILIDAE

Genus **Hesperodrilus**, Bedd. *em.* Michaelsen

Hesperodrilus, sp. incert.

St. WS 62. 19. i. 27. Wilson Harbour, South Georgia. From haul labelled "Moss dwellers" (so on the label; in the Station List WS 62 is said to consist of two hauls, from 15–45 and 26–83 m. respectively). A single specimen, not fully mature; along with five specimens of *Lumbricillus antarcticus*.

I am unable to identify the specimen; it seems, however, to be specifically distinct from *H. crozetensis*, recorded from South Georgia by Michaelsen (1905).

Family ENCHYTRAEIDAE

Genus **Marionina**, Michaelsen

Marionina georgiana (Michaelsen) (Figs. 1–3).

Pachydrilus georgianus, Michaelsen, 1888, p. 65, pl. ii, figs. 7 *a*, 7 *b*.
Marionina georgiana, Michaelsen, 1905, p. 5.
Marionina georgiana, Michaelsen, 1905 *a*, p. 15, pl. i, fig. 2.
Marionina georgiana, Baylis, 1916, p. 298.

St. MS 71. 9. iii. 26. From moss between Grytviken and Maiviken, East Cumberland Bay, South Georgia. Six specimens, mostly non-sexual or in early sexual stage, one fully mature; along with a single specimen of the genus *Achaeta*.

Michaelsen largely supplemented his original account (1888) by the examination of specimens from the Crozets (1905 *a*). The species appears to be somewhat variable, and the following notes may add to our knowledge.

Length 5–7 mm.; diameter 0·3–0·35 mm., up to 0·4 mm. at the clitellum. Segments 37, 38, 32 (? complete), 30 (? complete), 27 (apparently complete).

The setae are slightly lumbricilline in shape (i.e. with a slight double curve). The ventral bundles contain (3) 4, 5 (6) in front of the clitellum, and (2) 3, 4 behind; the lateral bundles have 2–4 setae both in front of and behind the clitellum.

The clitellum, occupying segments xii–xiii, is very slightly marked, and is wanting altogether ventrally.

Postpharyngeal bulbs are present (for a discussion of these structures cf. Stephenson, 1922 *a*, or for a short general description, Stephenson, 1930).

The dorsal vessel begins as a considerable swelling in segment xii.

The anteseptal portion of the nephridium is small, but not very small; it includes more than merely the funnel, and is about half as long as the postseptal; the duct is continued backwards and then downwards from the hinder end of the organ.

The cerebral ganglion is shown in Fig. 1; the shape scarcely agrees with that shown by Michaelsen in his original account, being narrower in the middle and broader behind, with the posterior lobes more rounded; but probably this only shows how

unreliable for diagnosis are slight or even moderately large differences in the shape of the ganglion in preserved specimens.

Contrary to Michaelsen, I found no copulatory glands in the segments behind the clitellum.

Each testis is divided into two lobes, one extending backwards ventrally, the other disposed vertically by the side of the alimentary canal, but the junction of the two is very broad and the lobes show little independence, unlike the numerous club-shaped lobes of the testes in the genus *Lumbricillus*, which are united only at the origin of their very attenuated stalks. The lower lobe may again show an incipient division. The male funnels are about three times as long as broad.

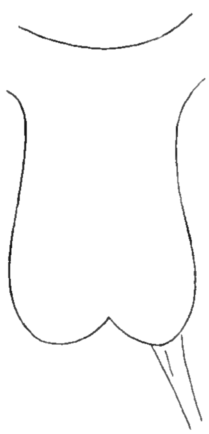

Fig. 1

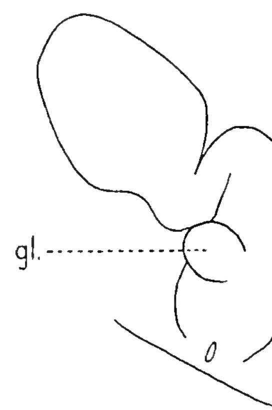

Fig. 2

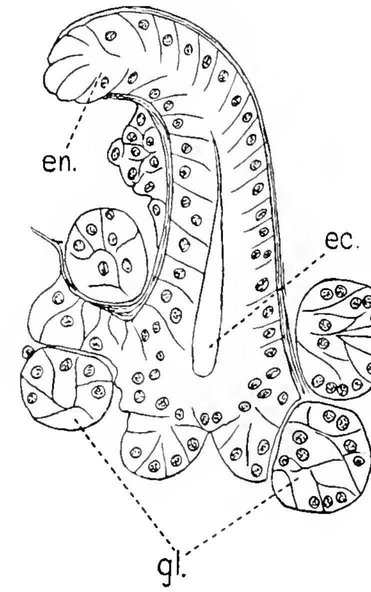

Fig. 3

Fig. 1. *Marionina georgiana*; cerebral ganglion.

Fig. 2. *Marionina georgiana*; spermatheca, drawn from a whole mount; the full number of gland masses attached to the duct were not visible, only one (*gl.*) being well seen.

Fig. 3. *Marionina georgiana*; section through duct of spermatheca. A portion of the duct is cut lengthwise, the broader, ectal part of the duct (*ec.*) being below, the narrower, ental bent portion above (*en.*). A number (seven) of aggregates of gland cells (*gl.*) cluster round the ectal portion; the cells in these stain considerably less heavily than those of the duct itself. × 500.

The spermathecae (Figs. 2, 3) have an ovoid or somewhat irregularly pyramidal ampulla, in length 100μ, prolonged at the ental end into a canal leading by a patent passage into the oesophagus. The tubular duct is well marked off, bent in the form of the letter S, and allowing for the bends is not far from twice as long as the ampulla; its diameter, at first 33–40μ, widens as it passes down, and the ectal portion of the duct is bulbous, 56μ in diameter. The epithelial cells which line the lumen of the duct become elongated and clearer in the bulbous portion, but are mostly still enclosed by the muscular coat. A few cell aggregates burst through the muscular coat, and form rounded lobes, of which one is seen in Fig. 2, and a number cut in section in Fig. 3. These

glandular lobes, not covered on the outside by the muscular coat, are (in the sexually mature specimen) 3 or 4 in number on one side and 7 on the other; the largest is 28 by 36μ as cut in section. (The gland masses were constantly two in number in Michaelsen's specimens.)

The species has been found in many various habitats, from purely marine (the canal system of sponges) and littoral (amongst roots of seaweeds and the rubbish of the shore), to purely fresh water (under stones in a pool) or more or less terrestrial (in moss).

Marionina grisea, sp.n. (Figs. 4, 5).

St. 189. 23. iii. 27. Port Lockroy, Wiencke Island, Palmer Archipelago. Shore coll. Three specimens, one small and non-sexual, one found on sectioning to be not fully mature, one sexually mature; along with *Lumbricillus maximus* and *L. lineatus*.

The longest specimen measures 14 mm., the next 11 mm.; diameter of the longest 0·68 mm. Segments 40, 33.

The worms are pigmented black on the dorsum; the pigment extends about as far as the level of the upper border of the ventral setal bundles, though it is thinner in the region between the lateral and ventral bundles. The pigment, while extremely dense dorsally in the most anterior segments, is very scanty, though, as seen in sections, not quite absent, in these segments ventrally. The youngest specimen is not so darkly pigmented, and in it the pigment extends downwards on each side only to the level of the lateral setae or very little below this. The pigment is situated below, not in, the epidermis; in the youngest specimen it forms a branching and anastomosing network, as if composed of branching chromatophores (though no nuclei are visible); in the largest specimen, as viewed whole, the black pigment is largely broken up into discrete roundish particles, though in some parts the chromatophore-like arrangement persists. In sections, the pigment appears as a brown granular deposit on the inner side of the body wall and in the muscular layer.

The prostomium is short, rounded, hemispherical. A head pore is apparently present.

The setae are lumbricilline in form; the ventral bundles comprise (6) 7 (8) setae in front of the clitellum, and the same number behind, falling at the hinder end to 4 or 5; the lateral bundles contain 4 or 5 in front and about the same number behind the clitellum.

The clitellum extends over segments xii–xiii; it is absent in the mid-ventral region. There is in the sexually mature (but not in the early sexual) specimen, ventrally in segment 10, a plate of thickened superficial epithelium, a single layer of tall cells, which contrasts strongly in its regularity, flatness, and equal thickness over its whole extent, with the thin (cubical or even lower) epithelium of the ventral surface of the segments behind it, and also with the more irregular epithelium of the segments in front, raised in a dome-like fashion (as seen in longitudinal sections) in each segment. The epidermis of these anterior segments is only half as thick as that of the plate in x, 20μ as against 40μ; while the thickness of the ventral epithelium of segments xi and xii is less again.

The gland cells in the integument, with their deeply staining contents, are arranged in transverse rows (as for example in *Lumbricillus lineatus*).

The body-cavity corpuscles are disc-like and subcircular, oval, somewhat triangular, or irregular in shape, with a spongy appearance when stained, and containing a small round homogeneous nucleus; in their greatest diameter they measure 25–35μ. Sometimes they appear to be degenerate, and coalesce into a loose network or an irregular coagulum-like mass.

Septal glands are present in segments iv, v and vi; from the posterior pair a large irregularly lobed mass projects on each side extensively into vii, reaching backwards more than half-way through the segment; these posterior lobes are covered by a fine membrane derived from septum 6/7, and represent as it were a hernia of the cell mass into the segment behind.

Salivary glands are absent. Postpharyngeal bulbs are, however, typically present, as usual in this genus and in *Lumbricillus*.

The chloragogen cells of the intestine show large vacuoles; a single vacuole may take up the greater part of the cell, or there may be more than one vacuole in a cell; the appearance is such as might result from large droplets of fatty matter having been dissolved out.

The dorsal vessel begins in segment xiii in one of the sectioned specimens, in xii in the other.

The preseptal part of the nephridia is small, and narrows slightly towards the septum; it comprises, however, somewhat more of the organ than merely the funnel. The shape of the postseptal varies—short and rounded, or more elongated. The duct also varies; in the postclitellar region it is short, and passes from the hinder and lower part of the organ downwards, or somewhat forwards or backwards, to the surface; it appears rather as if there were really no proper duct, the postseptal being bent at its hinder end, and narrowing, like an inverted cone, to reach the surface. In front of the clitellum, however, there really is a duct from the hinder end, at right angles to and as long as the postseptal.

The testes are already large even in the younger of the two sectioned specimens, and form each an elongated triangular mass, invested for the most part by a loose membrane, which is, however, lacking over a portion of the distal end of the gonad. This end is breaking up, and setting free masses of male cells; and large numbers of these developing sexual cells are free in the cavity of the segment. The body of the testis shows a tendency to cleave lengthwise, with the formation of a number of elongated club-shaped lobes not unlike those of *Lumbricillus*; the process is a cleavage only, not a separation, though in some sections a membrane can be seen between the lobes, like the membranes which envelope the club-shaped lobes of the testes of *Lumbricillus*.

The funnels are relatively short, 3 to $3\frac{1}{2}$ times as long as broad; the lip at the open end of the funnel is quite narrow and scarcely everted. The vas deferens, confined to segment 12, forms a loose coil, which pierces through a rudimentary penial body to end on a small rather indefinite male papilla.

The penial body (Fig. 4) is in considerable part embedded in the body-wall. It consists of (*a*) a number of much elongated cells, vertical to the surface, forming a mass 100μ in antero-posterior extent and 65μ in height; this is pierced by (*b*) the end of the vas deferens, and (*c*) also by the stalks of two large glands, the "prostates"; these structures are covered in by (*d*) a layer of muscular fibres, really the longitudinal layer of the body-wall, which appears here as the fairly definite capsule of the cell mass; adding the thickness of this capsule to the height of the cells, the vertical extent of the penial body is 78μ. The prostates (Fig. 4) are two on each side, one anterior and one

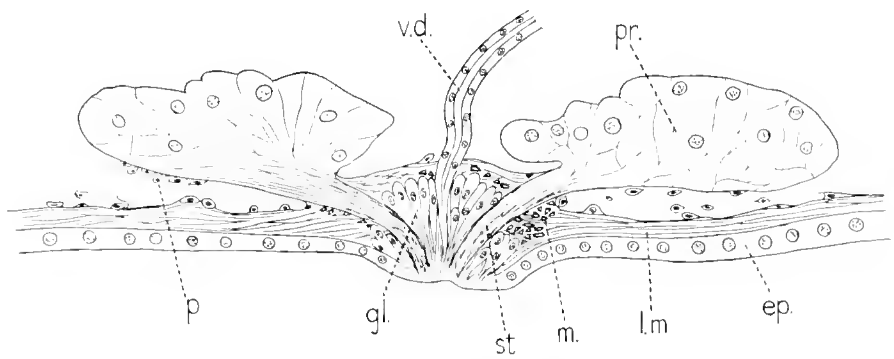

Fig. 4. *Marionina grisea*; prostates and "penial body" (combined from several sections); × 220. *ep.* surface epithelium; *gl.* glandular cells of the rudimentary penial body; *l.m.* longitudinal muscular layer of body-wall (the circular layer is not visible here); *m.* muscular fibres filling up angle between stalk of prostate and surface layers, and covering in gland cells of penial body; *p.* peritoneal cells; *pr.* "prostate"; *st.* stalk of prostate; *v.d.* vas deferens.

posterior; each is a conspicuous, somewhat flattened mass (flattened from above downwards) of spongy-looking gland cells, 200μ in antero-posterior and 240μ in transverse measurement; the glands thus take up a good part of the width of the segment. Each has a stalk composed of the aggregated thread-like prolongations of the cells; the stalks converge in the penial body, and eventually reach the surface close to the opening of the vas deferens.

The spermathecal apparatus (Fig. 5) consists of ampulla, duct, and glands, the duct being the largest portion of the whole. The ampulla is only slightly swollen (*ca.* 74μ in diameter), in the main tubular, about 120μ long; it is lined by cubical epithelium, and communicates by a narrow but patent passage with the oesophagus. The duct is bulbous or subspherical in shape, with a diameter of 110μ and a height of about 120μ; its lumen is narrow, and lined by elongated cells with nuclei at their bases; a muscular coat envelopes the bulb, and the heads of spermatozoa pointing down-

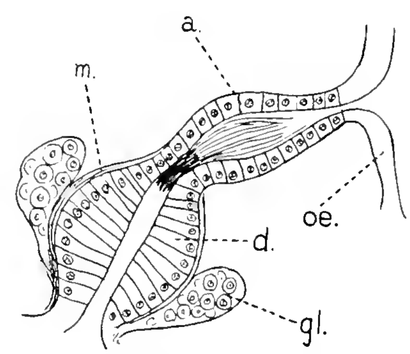

Fig. 5. *Marionina grisea*; spermatheca, in section, diagrammatic. *a.* ampulla; *d.* the bulbous duct; *gl.* gland mass; *m.* muscular layer of duct; *oe.* oesophagus. Spermatozoa are seen in the lumen, their heads in the constriction between ampulla and duct, their tails pointing upwards.

wards occupy the upper part of the lumen. The change in character of the lining epithelium, tall in the bulb (duct), low in the ampulla, is quite sudden. There are two, or sometimes three, glands in connection with the duct, attached to its lower portion.

There is a copulatory gland in segment xv, of some size, consisting of two halves, one on each side of the cord; each half is bilobed, the lobes being anterior and posterior, and the cord is not in the least covered over, the dorsal surface being quite free; indeed the gland does not invest the cord closely even at the sides, the two halves being thus quite separate. The gland rises up to a height of 100μ above the inner surface of the body-wall—double the height of the upper surface of the cord—but still does not reach the level of the gut.

The relations of this species will be considered along with those of the next.

Marionina aestuum, sp.n.

11. i. 27. Shore of Bay of Isles, South Georgia; from *Ulva* sp. between tide marks. Several specimens, some sexual; along with *Enchytraeus colpites*.

The length of the sexual specimens is 11–12 mm., and their diameter 0·6 mm., or slightly more at the clitellum. Segments 46, 47, 48.

The prostomium is short and rounded.

This, like the last, is a pigmented species; the pigment varies in depth from light to dark grey, and extends from the dorsal surface downwards on each side as far as the level of the ventral setae, or more densely to the level of the lateral setae and thence more lightly to the ventral setae. On a casual examination it appears never to extend all round the body; but a careful inspection in cedar oil showed that in the most anterior segments a number of scattered chromatophores are present in the ventral region also. As seen in sections the brown branched chromatophores are quite below the epithelium, in the longitudinal muscular coat and especially in a layer on the inner surface of this coat.

The setae are lumbricilline in shape, and are rather uncommonly numerous in each bundle. The ventral bundles comprise 14–17 setae in front of the clitellum; behind, 8–15 are found, the higher number only occasionally, the lower usually towards the hinder end of the body. The lateral setae are 8–13 per bundle in front of the clitellum, and 7–9 behind.

The clitellum, occupying segments xii–xiii, is saddle-shaped, very thick dorsally, absent ventrally, and lighter in colour than the neighbouring segments; there is a ventral groove between the well-marked lower border of the clitellum on each side; and the male porophores, situated at this lower border, look almost inwards. The appearance varies somewhat, however, probably with the degree of contraction of numerous muscular bands internally in this region. There is no ventral thickened cutaneous plate in segment x, as in *M. grisea*.

The epidermis contains very numerous and closely set gland cells, staining so deeply blue (with haematoxylin) as to appear black; indeed for a moment on first looking at the sections I doubted if the colour of the worms might not be due to these cells. The depths of the intersegmental grooves, and the areas immediately surrounding the setal bundles,

are free from these glands. The chromatophores are at a deeper level, are brown in colour, and branched; the pigment is in the longitudinal muscular coat and especially in a layer on its inner surface (cf. *M. grisea*).

The body-cavity corpuscles are small; many are spindle-shaped, mostly *ca.* 20 μ in length, though sometimes as much as 30 μ; others, about the same length, are much broader and subcircular in form; all are nucleated, the cell body staining lightly with eosin and granular in constitution.

The postpharyngeal bulbs are the best-developed examples of these enigmatical structures that I have ever met with. There are no salivary glands.

The septal glands are bulky, and take up a good deal of room in segments iv–vi; those of vi project back a long way into vii. In the second series of sections to be examined there was in segment vii a separate septal gland, not a part of that belonging to vi. Its connection with the gland in vi was effected by a non-staining stalk or strand (as the septal glands in each successive segment are always connected to those in front), and it passed backwards through a definite opening in septum 7/8 (not merely bulging this septum backwards) so as to occupy also the anterior part of segment viii. Altogether, therefore, the extent of the glands was quite unusual in this specimen.

The chloragogen cells of the anterior segments contain much brown pigmented matter.

The dorsal vessel arises in segment xiii, through the whole length of which it extends. From the staining reaction of its contents with eosin the blood presumably contained haemoglobin and was red in life.

The nephridia possess each a rather bulky anteseptal portion, with a cylindrical funnel and, in addition, an amount of glandular tissue; the anteseptal (82 or even perhaps 90 μ) is nearly as long as the postseptal (100 μ). The duct is as long as the postseptal; it may be given off from the lower surface of the postseptal some little distance from the hinder end of the organ, when it takes a curved course to the surface; its lumen is dilated, apparently forming a sort of reservoir, where it enters the body-wall. The place of origin of the duct, however, seems to vary; from the evidence of longitudinal sections it may be given off from the middle of the postseptal, or even from quite near the septum.

The testes are small organs, each consisting of 4 or 5 cylindrical or slightly club-shaped or pear-shaped lobes surrounded by no obvious capsule; the type of organ is really that characteristic of the genus *Lumbricillus*, since the organ is divided down to its base. Segment xi contains a large number of free male cells in various stages of development (morulae, bundles of spermatozoa)—so many that the anterior septum is much bulged forwards, nearly to the level of furrow 9/10; the ends of the testis lobes break up, and the cells become free, much earlier than in most species of *Lumbricillus*, so that the testes are here much smaller organs than usually in that genus.

The male funnel is about $2\frac{1}{2}$ times as long as broad; it is a stout organ, about half as broad as the available diameter of the segment; its everted rim or collar is narrow and projects only slightly. The vas deferens, 13 μ in diameter, is a loose coil of no great length; it reaches the surface through a cleft in the muscular mass which represents the penial

body, then runs between the stalks of the two "prostates" (*v. infra*), and finally penetrates the junction of the two stalks and the mass of cells which mingles with them where they abut on the surface.

The "prostate" glands, in segment xii, are very large, and lie, one anterior and the other posterior in position, against the lateral body-wall; the hinder end of the anterior touches the front end of the posterior gland. Each is a solid mass, in length 240–320μ by about 280μ in breadth, and is rather deeply lobed; the cells are prolonged into much elongated and fine thread-like stalks, along which the secretion probably passes, and which are aggregated to form a stalk for each gland; these stalks enter the body-wall, converge, and meet at the surface.

There is no definite penial body, that is, no definitely limited, spherical, encapsuled mass, composed mainly of elongated cells abutting on the terminal part of the vas deferens and the surface invagination into which the vas discharges. The stalks of the prostates, however, are enclosed in a loose mass of muscular fibres which run in many directions—a spongy mass, not of very definite outline, and not encapsuled but continuous with the tissues of the body-wall. This mass fills out the interior of the porophore, a projection of some size, at the tip of which is a special rounded aggregate, 100μ high, of moderately deeply staining cells derived from the surface epithelium; the stalks of the prostates, and also the vas deferens, enter and come to the surface through this aggregate, the elements of which the stalks are composed (the prolongations of the gland cells) mingling indistinguishably with the cells.

There is a much greater amount of muscular tissue in this "bulb" than in the corresponding structure of *M. grisea*; the mass has a vertical thickness of about 250μ, and envelopes the whole of the stalks of the prostates, comes into extensive contact with the base of the glands, and even surrounds their lower parts.

Many muscular strands pass inwards from the body-wall in the region of the male pores.

The spermathecal apparatus on each side (ampulla plus duct) forms a tube, the diameter of which does not vary very much from one part to another, the ampulla, however, being rather narrower than the duct (diameter of ampulla 70μ, of duct 85μ; or ampulla 61μ, duct 74μ), and about equal to it in length (about 160μ). The ampulla communicates by a patent passage with the oesophagus; in one specimen a plug, composed of the tails of spermatozoa, occupies the tubular passage through the oesophageal wall. Though there is no very sharp external limitation between ampulla and duct, the character of the epithelium of these two parts is quite different; the high clear cells of the duct give place abruptly to the low, more deeply staining cells of the ampulla, so occasioning a sudden change in the width of the cavity of the organ. The lumen of the duct contains the heads of numerous spermatozoa.

Associated with the spermatheca of each side are two masses of gland cells, one above and one below the ectal part of the duct, each mass about as thick as the duct. The stalks of these gland masses enter the muscular layer of the body-wall, and probably reach the surface close to the spermathecal pore; they do not discharge into the spermathecal duct, which is everywhere enclosed by a muscular investment.

A copulatory gland, small and asymmetrical, is present in segment xiv, and another, still smaller, in xiii.

In 1905 Michaelsen described (1905 *a*) from Kerguelen Island (in the southern part of the Indian Ocean) a dorsally and laterally pigmented worm which he named *Marionina werthi*. The chief characters were: a maximum number of 10 setae per bundle; testes (apparently of small size) consisting of a small number of separate cord-like lobes (i.e. "divided"); funnels probably about five times as long as broad; penial body bulbous, small, embedded in the body-wall; a single prostate; spermathecae broadly spindle-shaped, no distinct duct, no glands; copulatory glands in xiv, extraordinarily large, extending upwards towards the dorsal surface.

In 1922 Benham (1922) discovered amongst the worms collected on Macquarie Island (to the south of New Zealand) similarly pigmented specimens, which he supposed to belong to Michaelsen's species, and which he therefore did not describe fully, contenting himself with giving the points in which they differed from the latter author's description. Thus they had a maximum of 13 setae per bundle; the prostates were "some in front of, and others behind the sperm pore" (they are shown in the figure as in two groups, an anterior and a posterior, opening independently of each other and of the vas deferens); no penial bulb; the spermathecal ampulla considerably wider than the duct, from which it is distinct; two gland masses opening into the ectal end of the duct.

M. grisea, from the Palmer Archipelago, described on p. 243, has much the same pigmentation as the two foregoing groups of specimens (apparently less pigment is present on the ventral surface of the anterior segments); the maximum number of setae per bundle is 8; the testes are large, and show a commencing cleavage into lobes like those of *Lumbricillus*; the funnels are 3–3½ times as long as broad; the prostates are two on each side, anterior and posterior; the penial bulb is of small size, not distinctly encapsuled, somewhat indefinite in its limits, and mostly contained within the body-wall; the spermathecal duct is bulbous in form, broader than the ampulla, and has two glands associated with it; the copulatory glands are in xv, and do not reach the level of the intestine; there is a thickened ventral plate of epithelium in segment x.

Finally *M. aestuum*, from South Georgia, has the same pigmentation as the last; the maximum number of setae per bundle is 17; the testes are small, and consist of a small number of separate cord-like lobes ("divided"); the funnels are 2½ times as long as broad; the prostates are much as in *M. grisea*; a penial bulb can scarcely be described, but a large spongy muscular mass envelops vas deferens, stalks of prostates, and a group of gland cells; the spermathecal apparatus is tubular, and the duct distinct, broader than the ampulla, associated with two gland masses; copulatory glands in xiii and xiv, small or very small; no ventral plate in x.

We may first compare Benham's worms with *M. werthi*. Benham implies that the structural differences between his specimens and Michaelsen's are sufficiently great to justify their separation as a distinct species—or at least would be so, were it not for the similarity of pigmentation ("were it not that the pigmentation is so unusual I should be inclined to make a new species for it"). Thus in *M. werthi* the spermathecal apparatus

is broadly spindle-shaped, and there is neither a distinct duct nor any associated glands; in Benham's worms the ampulla and duct are distinct, the ampulla being (from the figure) considerably wider, and there are two glands. Further, there is a small penial body in *M. werthi*, none in Benham's specimens; one prostate, apparently, in *M. werthi*, but a number of glandular masses aggregated into a few groups in Benham's worms. If the two worms described above (*M. grisea* and *M. aestuum*), with the same pigmentation, possess, like Benham's specimens, distinctive structural differences such as would ordinarily be sufficient to characterize separate species, then I think Benham's reason for merging his worms with Michaelsen's will disappear, and we shall have a group of species, closely related, no doubt, with the peculiar pigmentation as a common feature.

The worms which I have called *M. grisea* differ from *M. werthi* principally in the testes (massive, with clefts in their substance but not divided into free club-shaped lobes); in a very distinct division of the spermathecal apparatus into bulbous duct and spindle-shaped ampulla, and in the presence of two associated glands; in possessing two large and definite prostates; and in having copulatory glands, of only moderate size, in segment xv (instead of very large glands, in xiv).

The specimens from South Georgia, *M. aestuum*, are distinguished from *M. werthi* principally by the extraordinarily large number of setae per bundle; the tubular spermathecal apparatus with well-defined duct and associated glands; the prostates, as in *M. grisea*; the small or very small copulatory glands in xiii and xiv; and probably by considerable differences in the penial body. *M. aestuum* is distinguished from *M. grisea* by the number of setae per bundle, the form of the spermathecal apparatus, the small and divided testes, the copulatory glands in xiii and xiv (instead of in xv only), and by the absence of the ventral epithelial plate in x.

The value of this last feature is not quite certain; it is not described in *M. werthi* or by Benham for his specimens, but it might possibly have been overlooked, or not thought worthy of mention. It appears definitely to characterize *M. grisea* as contrasted with *M. aestuum*.

On the whole I consider that the differences between these four forms, especially in the spermathecal apparatus, and in a somewhat less degree in the testes, penial body and associated structures, and in the copulatory glands, are sufficient to justify their separation. They form a closely related group, but I cannot arrange them in a series showing, for example, a progressive evolution or regression of the distinctive characters according to distribution from west to east or *vice versa*. On the whole the group appears to be a primitive one; the testes show the first stages, but only the first stages, in the evolution of the condition characteristic of the genus *Lumbricillus*, and the lumbricilline penial body is either absent or present in a very indefinite form; the prostates, however, are a special development, not ordinarily found either in *Marionina* or *Lumbricillus*.

For the worms described by Benham (1922) I propose the name *M. benhami*.

The difference between the two genera *Marionina* and *Lumbricillus* lies in the testes—massive in *Marionina* and not divided to the base, divided in *Lumbricillus* and forming numerous pear-shaped lobes attached by their narrow ends, each enclosed in a mem-

brane within which the sexual cells are shed and undergo their development into sperm morulae and spermatozoa. The four species here discussed are so closely related that they must obviously go in the same genus; but it is somewhat doubtful which this ought to be. It seems to me that the condition of the testes in *werthi* and *aestuum* resembles rather that of *Lumbricillus*, in *grisea* that of *Marionina* (nothing is stated regarding the testes of *benhami*, which we may perhaps infer to resemble those of *werthi*). I place the whole group in the genus *Marionina*, however, because Michaelsen (after some hesitation) decided to refer his species *werthi* to this genus.

Genus **Lumbricillus**, Örst.

Lumbricillus lineatus (Müll.).

Pachydrilus verrucosus, Ude, 1896, p. 3, pl., fig. 6 *a*, 6 *b*.

St. 122. 14. xii. 26. Maiviken, West Cumberland Bay, South Georgia. Shore coll. (salt water). A number of specimens; along with *Lumbricillus maximus*.

St. 166. 19. ii. 27. South-east point of Paul Harbour, Signy Island, South Orkneys. Shore coll. A number of specimens; along with *Lumbricillus maximus*.

St. 189. 23. iii. 27. Port Lockroy, Wiencke Island, Palmer Archipelago. Shore coll. Several specimens; along with *Lumbricillus maximus* and *Marionina grisea*.

The species is the same as that previously recorded, under the name of *Pachydrilus verrucosus*, by Ude from Tierra del Fuego (Ude, 1896). It is one of the commonest of the shore Enchytraeids of British coasts, and is well known from other European countries also, and from inland stations as well as from the coasts. It is a variable species, and has consequently been described under many names (cf. Stephenson, 1922).

In the specimens from Wiencke Island and from the South Orkneys the septal glands are remarkably small. As is commonly recognized, these glands often or usually consist in each segment (iv, v and vi) of a portion in close association with the posterior septum of the segment and often appearing to be contained between the two lamellae of the septum, and a forwardly projecting lobe on each side ventrally in the segment. In the specimens just mentioned the septal portions of the glands are reduced to a few cells only, between the two layers of the septa; the forwardly projecting lobes are also reduced, but not quite to the same extent. In the examples from South Georgia, however, the glands are of large size.

One of the most variable organs of this worm appears to be the male funnel; in the several descriptions of the species under its various names different proportions are given for the funnel, from 2 to 9 times as long as broad. In worms from one locality in Scotland I found the funnels from $2\frac{1}{2}$ to 6 times as long as broad (Stephenson, 1922), while in those from another place the funnels in the intact worm might be as much as 9 times, but might contract, on teasing the worms to isolate the internal organs, to as little as twice as long as broad (Stephenson, 1911 (*L. subterraneus*)). In the present specimens they appear to be in some cases 5 or 6 times, in others 8–10 times as long as broad.

A notable characteristic of the species is the presence of transverse rows of very deeply staining (with haematoxylin) gland cells in the integument.

Lumbricillus maximus (Michaelsen) (Fig. 6).

Pachydrilus maximus, Michaelsen, 1888, p. 56, pl. i, fig. 1 *a–e*.
Lumbricillus maximus, Michaelsen, 1905 *a*, p. 10.
Lumbricillus maximus, var. *Robinson*, Michaelsen, 1905 *a*, p. 11, pl. i, fig. 1.

St. 122. 14. xii. 26. Maiviken, West Cumberland Bay, South Georgia. Shore coll. (salt water). A number of specimens; along with *L. lineatus*.

St. 166. 19. ii. 27. South-east point of Paul Harbour, Signy Island, South Orkneys. Shore coll. A number of specimens; along with *L. lineatus*.

St. 179. 10. iii. 27. Melchior Island, Schollaert Channel, Palmer Archipelago. In creek to south of south-west anchorage. Shore coll. Numerous specimens.

St. 189. 23. iii. 27. Port Lockroy, Wiencke Island, Palmer Archipelago. Shore coll. A number of specimens; along with *Lumbricillus lineatus* and *Marionina grisea*.

St. MS 70. 9. iii. 26. Maiviken, West Cumberland Bay, South Georgia. Shore coll. A number of specimens.

The present species was first described by Michaelsen, from South Georgia, in 1888; in 1905 the same author gave additional particulars of its anatomy derived from specimens from other southerly latitudes (the Crozets and Kerguelen), and described a variety from New Amsterdam Island (in the south of the Indian Ocean). The following notes, however, are perhaps not quite superfluous.

The longest specimen met with measured 45 mm.—a giant among Enchytraeids; others were 40 mm., others 30 mm. and less; mature worms were found of all sizes down to 17 mm., and some even shorter—13, 12, and 11 mm. The number of segments did not vary as much as the length, the limits, among the worms whose segments were counted, being 55–70, and commonly the number was not very far from 60.

The ventral setae are (3, 4) 5, 6, 7 per bundle in front of the clitellum, and (3) 4, 5 (6) behind; the lateral (3) 4, 5 in front of and (2) 3, 4 behind the clitellum.

In the integument are numerous gland cells staining very deeply with haematoxylin, arranged in transverse rows, as in *L. lineatus*.

The septal gland of segment vi bulges backwards into vii; the portion which is in relation to septum 6/7 pushes back the septum (or the posterior of the two lamellae of the septum; cf. what was said under *L. lineatus*) after the manner of a hernia, and may thus reach the level of septum 7/8.

There is a pair of postpharyngeal bulbs, in the usual situation.

The dorsal vessel usually begins, as described by Michaelsen, in xv, but occasionally further back, in xvi or xvii. The blood stains (haematoxylin and eosin) a dull dark purple, which probably indicates that it contained a little haemoglobin during life.

The male funnels vary much in length, from as little as 3–5 times as long as broad to as much as 7–9 times, or even 10 and possibly 12 times; but Michaelsen's figure of about 8 times is a fair average estimate. They sometimes (? always) become narrower backwards; thus in one case the diameter at the anterior end was 160 μ, at the hinder end 110 μ; the hinder end may project back in a cone-like manner through septum 11/12. The rim or flange at the anterior end is (? always) enormously broad, as shown in Fig. 6.

The penial body constitutes a subspherical mass about 200μ by 250μ; it is surrounded by a strong muscular capsule, and contains much elongated gland cells as well as a stroma or scaffolding of muscular or connective tissue strands.

The spermathecae of these specimens agree with Michaelsen's corrected description (Michaelsen, 1905 *a*). I made a very considerable number of series of sections from the five batches of specimens of this worm, and in describing them my notes more than once say that the duct is marked off from the ampulla; but from drawings made at the same time this marking off appears to be due, as in Michaelsen's specimens, to a kinking at this place. In other examples the short, somewhat bent duct soon widens, its high columnar epithelium becomes gradually lower, and without distinct demarcation the duct becomes the ampulla. The ectal end of the duct is surrounded by a crown of gland cells, relatively smaller than in *L. lineatus*, and slightly lobed; the cells composing this mass are, as usual, epithelial cells of the duct lining, greatly elongated, extending outwards far beyond the muscular investment of the duct.

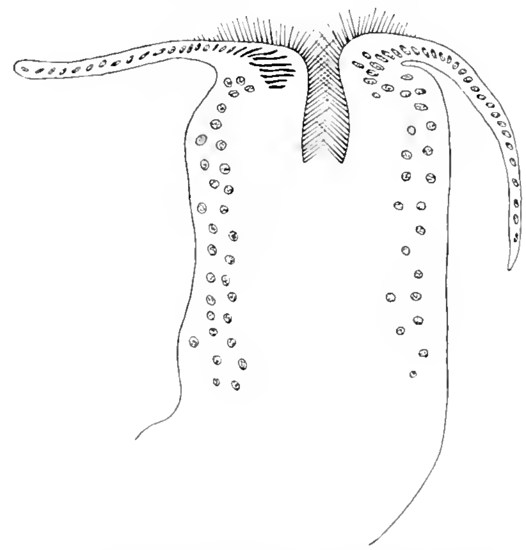

Fig. 6. *Lumbricillus maximus*; male funnel as cut in one of the sections, showing the relatively very broad rim. × 210.

The copulatory glands are, as in Michaelsen's specimens, in segments xiv, xv and xvi.

I have previously (p. 237) described the degenerative changes which are very frequently found affecting the internal organs in this species.

Michaelsen (1905 *a*) described from New Amsterdam Island a var. *Robinson* of this species, characterized by its smaller size (12–16 mm.) and by the penial body being divided into two lobes by a transverse cleft, as well as, apparently, by the shorter nephridial duct. In my specimens the length is graduated from 45 mm. down to 11 mm.; I did not notice among the shorter specimens the other distinctive features mentioned by Michaelsen, but I cannot affirm their absence.

Some time ago I suggested (1922), without having any direct acquaintance with *L. maximus*, that it might be identical with *L. lineatus*. Now, after having at my disposal a large number of examples, I do not think it is, though it is very closely related. The arrangement of the gland cells in the superficial epithelium in regular transverse rows is suggestive of identity, and also the wide variability in the proportions of the male funnel in different specimens. Indeed, bearing in mind the variability of *L. lineatus*, the only distinction I can point to is in the spermathecae, and even here the difference is by no means so clear-cut as one could desire; in neither species is the duct sharply marked off from the ampulla; but the form of the ampulla is spindle-shaped in *lineatus*, more swollen, on the whole, and more irregular, and the duct relatively narrower, in

maximus; while the glands round the ectal end extend much further up the duct—as far as the base of the ampulla—in *lineatus*.

Lumbricillus macquariensis, Benham (Fig. 7).

Lumbricillus macquariensis, Benham, 1905, p. 295, pl. xiv, figs. 8, 11, 12, 13.
Lumbricillus intermedius, Benham, 1909, p. 261, pl. x, figs. 8–11.
Lumbricillus macquariensis, Benham, 1915, p. 189.
Lumbricillus macquariensis, Benham, 1922, p. 6.
Pachydrilus intermedius, Michaelsen, 1923, p. 197.

Undine, South Georgia. iii. 26. Six specimens, mostly mature. Note by collector: "Specimens of Crustacea, Oligochaeta, Coleoptera, dipterous larvae and puparia, and apterous Diptera found living together under stones on the upper edge of the beach at Undine Harbour, South Georgia."

The present species has hitherto only been known from the islands to the south of New Zealand (Macquarie, Auckland and Campbell Islands); it is interesting, therefore, to find it now in South Georgia in the same latitude as these islands but distant from them by nearly half the circumference of the globe. Since this distribution is possibly of some importance, I give below some particulars which will permit other workers to check my identification.

The specimens are the stoutest worms in the present collection; the largest is about 22 mm. long (all are more or less curled) and 1·25 mm. thick, while a smaller one, also sexually mature, is 15 mm. long and 1 mm. thick. The largest has 72 segments, the smaller specimen 52; the external segmentation is well marked. I did not find the prostomium as in Benham's *L. intermedius*—"rather long, about equal to the first two segments together"—but blunt and rounded.

The ventral setae are 6 (7) in the preclitellar, (4) 5, 6 in the postclitellar bundles; the numbers for the lateral setae are 5, 6 and 4, 5 respectively.

The clitellum, as seen in sections, includes segments xii and xiii and encroaches slightly on xi and xiv; it is absent mid-ventrally.

There are numerous deeply staining gland cells in the integument, in irregular transverse rows; the furrows, however, are free from these cells.

The coelomic corpuscles are subcircular or irregularly shaped disks, 18–24μ in diameter, nucleated and of granular constitution, numerous and all of one kind.

The septal glands are bulky; the hindmost, belonging to segment vi, projects backwards into vii so as to reach a level not far from septum 7/8.

Postpharyngeal bulbs are present, as usual in the genus, but no salivary glands.

The dorsal vessel begins in segment xv; the intestinal sinus may be somewhat swollen dorsally in xvi, though a definite vessel does not seem to be present here.

The nephridia are conspicuous organs in sections, more so than usually. The anteseptal is small, though it includes a little more of the organ than merely the funnel. The postseptal seems contracted antero-posteriorly, short and "hunched up" in appearance, and may be of greater extent vertically than from front to back. The duct is given off from the hinder end of the organ, and is usually longer than the postseptal—indeed it may be quite double the length; it passes down, or sometimes downwards and back-

wards, or with an S-shaped curve, to the surface; its ectal portion is wider, and except, apparently, when the duct is put on the stretch has a distinct cavity or small reservoir.

The male funnels are about 5 times as long as broad, and possess a broad flange-like rim.

The spermathecal ampulla (Fig. 7) is of a somewhat oblong shape, and about $1\frac{2}{3}$ times as long as wide; it communicates with the oesophagus by a narrow passage which runs out to a point at the oesophageal wall; the opening is scarcely patent in these specimens. The duct is about half as long as the ampulla, and less than half as wide, and the separation between duct and ampulla appears at first to be fairly definite. In a longitudinal section of the organ, however, the tall columnar cells of the duct extend far into the ampulla—to nearly half its height, where they suddenly give place to a much lower, approximately cubical epithelium, which lines the upper portion of the cavity. Around the base of the duct, not covering its whole length, is a crown of gland cells, a lobed mass consisting really of some of the cells of the lining epithelium of the duct which have elongated outwards through the muscular layer of the duct. Not all the epithelial cells of the ectal end of the duct are thus elongated; there is still an epithelial lining with nuclei basally situated, then on the outside of this layer a thin muscular coat with interruptions for the passage of the elongated gland cells, and then the bodies of these cells with their nuclei irregularly distributed.

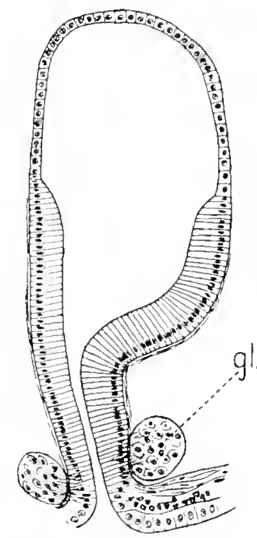

Fig. 7. *Lumbricillus macquariensis*; spermatheca in section, showing sudden transition of cubical epithelium of upper part of ampulla to high columnar of lower part of ampulla and duct. *gl.* gland mass forming a crown round ectal end of duct.

Copulatory glands are present in five segments, xiv–xviii; in the anterior segments of the series they are of moderate size—largest, and equally large in xiv and xv; they then diminish in size backwards, and in xviii are very small. All leave the dorsal surface of the cord free. My series of sections do not go back beyond xviii, but from the small size of the glands in this segment it seems improbable that there should be any more behind this point.

The correspondence between these specimens of mine and Benham's worms is close. The number of copulatory glands is larger than that given by Benham, though as an exception the present number (five) was even exceeded by one of Benham's specimens. Similarly, though in his worms the dorsal vessel did not usually arise in xv, it did so occasionally. Septal glands are said by Benham to be present in vii; possibly the condition is really not unlike that described above.

Most of the other features are sufficiently similar in Benham's worms and mine to call for no remark.

Lumbricillus antarcticus, sp.n. (Fig. 8).

St. WS 62. 19. i. 27. Wilson Harbour, South Georgia. From haul labelled "Moss dwellers" (the above is taken from the label; in the Station List WS 62 consists of two hauls, from 15–45 and 26–83 m. respectively). Five specimens; along with a specimen of *Hesperodrilus* sp.

Length 6–7 mm.; diameter 0·43–0·52 mm. Segments 35–38.

Prostomium rounded, hemispherical. Head-pore between prostomium and segment i.

Setae lumbricilline in shape; the numbers vary within rather wide limits—in the ventral bundles 3–7 per bundle in front of the clitellum, 3–6 per bundle behind; the corresponding figures for the lateral bundles are (2) 3–5 and 2–5 respectively.

The clitellum embraces segments xii–xiii; it is absent ventrally and is not well marked even dorsally.

There are no rows of deeply staining gland cells in the integument.

The body-cavity corpuscles are oval or of an elongated pear shape, 18–20μ in longest measurement; they stain very deeply, the nuclei appearing as a clearer area in the centre.

The septal glands are fairly bulky, but those belonging to segment vi do not push back in any marked degree into vii (as, for example, in *L. maximus* and *L. macquariensis*).

A pair of postpharyngeal bulbs are present, as is the rule in the genus; these appear to take the place of salivary glands which, as usual, are absent.

There is no sudden widening of the oesophagus to become the intestine; there is a slight localized dilatation in segment x, and another in xiv, but it seems doubtful whether these have any importance.

The dorsal vessel originates in segment xiii.

The anteseptal portion of the nephridium is small, but nevertheless comprises a little more of the organ than the mere funnel. The duct is given off from the hinder end; it is half as long as the postseptal or sometimes more—almost as long as the postseptal, and passes downwards and somewhat forwards.

The testes consist of large, typically pear-shaped lobes, containing within the investing membrane male cells, morulae in various stages of development, and ripe spermatozoa. The lobes radiate from their attachment at their narrow ends in a fan-like manner (as seen in longitudinal sections), forwards into segment x and backwards into xi; one large lobe gets into ix and one into xii (in the specimens sectioned).

The funnels are remarkably short, only $1\frac{1}{4}$ or $1\frac{1}{5}$ times as long as broad at their free end; in shape they are rather triangular or pear-shaped, becoming very much narrower at their base where they pass into the vas deferens; there is no projecting flange-like rim. The vas deferens is confined to segment xii, forming a close coil behind septum 11/12; it is relatively stout, 16μ in diameter. The penial body is of the usual lumbricilline type, roundly ovoid in shape, with a muscular capsule, the longer (antero-posterior) diameter 200–240μ.

The spermathecal ampulla (Fig. 8) is somewhat spindle-shaped or rather perhaps of an inverted pear shape; its ental end is prolonged to the oesophagus, with which it communicates by a patent passage; spermatozoa are seen to be attached to and to

penetrate within the epithelial layer of the ampulla. The duct is short; the narrow lumen of the duct expands rather suddenly at its upper end to become the cavity of the ampulla; in this sense ampulla and duct are fairly well marked off from each other, though externally there is no very precise delimitation. A complete circle of glands surrounds the whole length of the duct and embraces the base of the ampulla; the glandular mass is lobed, and consists of the bodies of the cells of the duct epithelium, all the cells being prolonged through the muscular coat, which is visible as a single layer of fibres running longitudinally on the duct; there are no nuclei in the basal portions of the cells internal to the muscular layer.

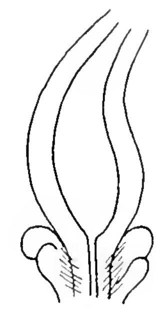

Fig. 8. *Lumbricillus antarcticus*; spermatheca as reconstructed from sections; a glandular mass envelopes the whole of the duct.

Copulatory glands are present in segments xiii, xiv and xv; they are of moderate size, and leave the dorsal surface of the cord quite free; those in xiii are rather smaller than those of the other segments.

The present species is related not distantly to *L. lineatus*, but appears to be distinguished from it by the shortness of the male funnel; it is alone among the southern species of this genus in having these proportions.

Genus **Enchytraeus**, Henle

Enchytraeus albidus, Henle.

Enchytraeus humicultor, Ude, 1896, p. 26.
Enchytraeus humicultor var. *similis*, Ude, 1896, p. 27.
Enchytraeus albidus, Michaelsen, 1903, p. 142.
Enchytraeus albidus, Michaelsen, 1905, p. 8.
Enchytraeus albidus, Michaelsen, 1905 *a*, p. 17.
Enchytraeus albidus, Benham, 1905, p. 295.

St. 122. 14. xii. 26. Maiviken, West Cumberland Bay, South Georgia. Shore coll., fresh water. Several specimens, mostly with signs of sexual maturity.

Same locality and date. Under stones near upper lake; along with *E. australis*. Several specimens.

This is one of the Enchytraeids of the northern hemisphere which is also found in southerly latitudes; in the list of papers given above it is recorded from South Georgia (Bay of Isles), Tierra del Fuego and the Straits of Magellan, the Falkland Islands, the Campbell and Macquarie Islands, Kerguelen, and the Crozets. With the possible exception of *Lumbricillus lineatus*, it is perhaps the commonest member of the family in Europe; *L. lineatus* is found predominantly on the shore, but also inland, while *E. albidus* is predominantly terrestrial but is also found on the shore.

The sections of the present specimens attracted my attention by reason of the very wide central lumen of the sperm funnels.

Enchytraeus australis, sp.n. (Figs. 9–11).

St. 122. 14. xii. 26. Maiviken, West Cumberland Bay, South Georgia. Under stones near upper lake. Several specimens; along with *E. albidus*.

St. WS 123. 8. vi. 27. Gough Island. Shore coll.; under bark of a rotten tree. Fourteen specimens.

Length 6–7 mm.; diameter 0·3 mm. Segments 37–42.

Prostomium blunt, rounded. Head-pore between prostomium and segment i.

Setae enchytraeine in shape, the points fairly sharp; the setae are large and strong near the hinder end (length near the hinder end 76μ, in the anterior segments 64μ). The number per bundle is very fairly constant—three throughout the body, in both ventral and lateral bundles; two in the lateral bundles in segment xii and occasionally at the hinder end.

The clitellum, embracing segments xii–xiii, is not conspicuous, and is absent ventrally. The gland cells of the clitellum are arranged in regular transverse rows.

There are in general no deeply staining gland cells in the epidermis.

The coelomic corpuscles vary in their numbers; they are oval, pear-shaped, or spindle-shaped, 25μ in maximum length, rather darkly staining, with nuclei.

Salivary glands are present, arising from the recess behind the dorsal plate of the pharynx; they are twisted tubes, narrow but of varying diameter, and form a coiled mass which extends back into segment iv; I saw no branching.

There is no sudden widening of the oesophagus to form the intestine. In general, there is nothing remarkable about the chloragogen cells; they contain numbers of minute refractile particles, possibly oil-like globules (though any oily matter would have been dissolved out by the xylol in the preparation of the sections), appearing as scarcely more than dots even with the high power, in diameter about 1μ. Sometimes, however, in some parts of the body, the chloragogen cells are hollow, and appear as a small layer of protoplasm surrounding a central cavity—perhaps a space from which a fatty inclusion has been dissolved out.

The dorsal vessel begins in segment xiii.

The anteseptal portion of the nephridium is small, about twice as long as it is broad, and consists of the funnel only. The duct is about as long as the postseptal, and is given off often from the hinder end but sometimes from a place somewhat in front of this, running (observed chiefly in the posterior part of the body) downwards or downwards and forwards to the surface.

The cerebral ganglion is longer than broad (about $1\frac{1}{3}$–$1\frac{1}{2}$ times as long); its appearance, in two specimens, is shown in Fig. 9. The sides converge slightly forwards or are almost parallel; the hinder border is not sharply notched, but gently hollowed.

The testes are massive organs, each of which extends into the two segments x and xi, with one large lobe in each segment, the lobes being widely continuous ventrally between the segments; or the organ may be a single mass with hardly any distinction of lobes. Each testis is contained within a thin membrane, the testis sac, which encloses also male cells in all stages of development up to the ripe spermatozoa.

The male funnels (Fig. 10) are relatively small, and each appears to be triangular in shape; this is due to the organ being bent together on itself, as shown in the figure. This condition was seen in five sectioned specimens and in others examined whole, and appears therefore to be constant. As seen thus, the funnels are about as broad as long, but if straightened out they would probably be about three times as long as broad.

The vas deferens forms a coil, not large, but close, behind septum 11/12 and in front of the male aperture, in the anterior and ventral part of segment xii; it is 10μ in diameter, and enters the penial body on the dorsal side of the latter.

The penial body is of lumbricilline type—a definite, compact organ with muscular and peritoneal investments, regularly ovoid in shape except that it is indented—slightly bifid or bilobed—on its internal aspect; its antero-posterior length is 105μ and its height 70μ. There are no other glandular masses in relation with the male aperture.

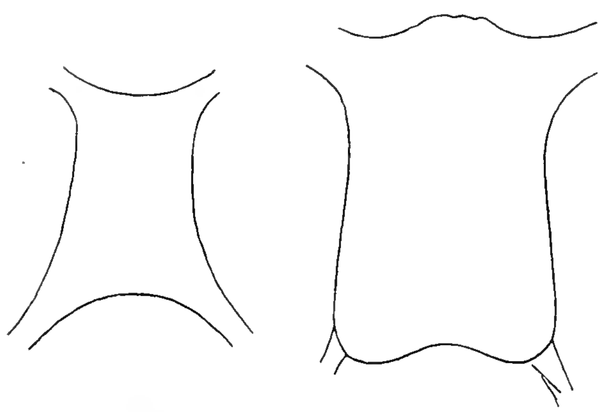

Fig. 9. *Enchytraeus australis*; cerebral ganglion; both forms were observed.

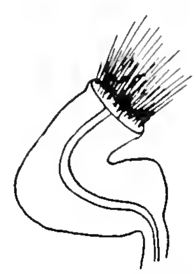

Fig. 10. *Enchytraeus australis*; male funnel.

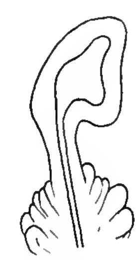

Fig. 11. *Enchytraeus australis*; spermatheca.

As seen in specimens mounted whole, the spermathecal ampulla (Fig. 11) is of relatively small size, irregular in form, with a bulging on one side; in sections most of the series show it to be somewhat compressed antero-posteriorly; spermatozoa are seen pushing their heads into the epithelial lining; and there is a patent communication with the oesophagus. The duct is cylindrical, of some length—longer than the ampulla, but rather narrow (26μ) where not covered by glands; it is well marked off from the ampulla. The ectal half or rather more of the duct is covered all round by a glandular lobed mass, which as usual consists of the cells which line the lumen of the duct elongated and pushing outwards through the fibres of the muscular coat.

There are no copulatory glands.

For some time I thought it possible that the present specimens might be referable to Vejdovsky's *Enchytraeus buchholzi*, a common European species which has also been recorded from the Straits of Magellan (Ude, 1896). I have, however, decided to separate them as a new species on the following grounds:

(i) The number of segments—round about 40 in a considerable number of examples, as against 25–28 in *E. buchholzi*.

(ii) The almost absolute constancy of the number 3 for the setae in all bundles—which (though given by Ude, for example, as the usual number) seems not ordinarily to be so definitely fixed in *E. buchholzi*; Michaelsen (in examples of this species which may constitute a distinct variety) found 3 in the preclitellar ventral bundles only, and elsewhere always 2; Vejdovsky's original account (1879) gives 2, 3 or 4 per bundle, Southern (1906) usually 3, often 2, rarely 4.

(iii) The shape of the funnel in the worms here described appears to be quite characteristic; I cannot recall that it has been described in any other Enchytraeid.

(iv) One of the chief features of *E. buchholzi*, mentioned in all descriptions, is the constitution of the large chloragogen cells, which are filled with large refractile oily globules. In sections, of course, the oil drops would have been dissolved by the xylol used in preparation, and would be represented by vacuoles; such vacuoles I have never seen in any of the several series of sections which I prepared, nor were any oil globules visible in the cells in whole mounts in cedar oil, nor in teased specimens. On the other hand, I have seen such vacuoles, answering exactly to Vejdovsky's description and figure (Vejdovsky, 1879) of those of *E. buchholzi*, in *E. colpites* (*v. post*), a species which, however, cannot be confused with *E. buchholzi*.

As less important points may be mentioned: (v) the fact that in *E. australis* the dorsal vessel originates within the clitellar segments, in *E. buchholzi* behind them; (vi) that the extent of the glands round the spermathecal duct is greater in the present specimens than in *E. buchholzi*; and (vii) that the salivary glands appear to differ considerably from those of *E. buchholzi* as illustrated and described by Vejdovsky, though it is possibly allowable to suspect some degree of schematization in this author's figure.

Enchytraeus colpites, sp.n. (Figs. 12, 13).

11. i. 27. Shore of Bay of Isles, South Georgia; from *Ulva* sp., between tide marks. Several specimens; along with *Marionina aestuum*.

Length 15–16 mm.; diameter 0·8 mm., or 1 mm. at the clitellum. Segments 37, 38, 39.

Prostomium blunt, rounded.

Setae lumbricilline in form (with double curve); some, however, almost or quite straight at the distal end (enchytraeine). The ventral bundles contain (4) 5, 6 setae both in front of and behind the clitellum, the lateral (2, 3, 4) 5 (6) in front and (4) 5 (6, 7) behind.

The clitellum includes segments xii–xiii, and is absent ventrally.

There are no rows of large gland cells with deeply staining contents in the epidermis, but in each segment are to be seen two bands of small, scattered, deeply staining cells, one in front of and one behind the setal zone.

The coelomic corpuscles are spindle-shaped or oval, 25–36μ in long measurement; they have not all the same appearance, some being granular and others more homogeneous in constitution.

The septal glands are large, and that of segment vi (in relation to septum 6/7) bulges backwards extensively into segment vii, so as to reach the hinder end of the segment.

There are no salivary glands, but a pair of postpharyngeal bulbs arise, as in the genera *Marionina* and *Lumbricillus*, from the recess behind the dorsal pharyngeal plate.

There is no sudden widening of the oesophagus. In specimens mounted whole the very dark chloragogen investment, beginning in segment v, is remarkable, and is rather characteristic of the species. The chloragogen cells are large and elongated, up to 57μ in height; the nucleus is not far from the middle, and the greater part of the interior of the cell is taken up by half a dozen or more large vacuoles, in series or sometimes two abreast (this appears to be the condition which is described for *E. buchholzi*). The very small (1μ or less) brown chloragogen particles are numerous in the anterior segments.

The dorsal vessel begins at the anterior end of segment xiv, just behind septum 13/14 (in two sectioned specimens), or (in a third) extends through the whole of segment xiv. The blood stains red with eosin (indicating the presence of haemoglobin), and was therefore red during life; in some of the vessels are red-staining crystals, perhaps crystals of haemoglobin.

The nephridia present an extremely elongated funnel constituting the preseptal portion, 80μ in length by 20μ in diameter, with long cilia pointing down the tube and others directed outwards from the lip of the funnel. The shape of the funnel appears cylindrical in some cases, more conical, narrowed towards the septum, in others; this depends probably on the plane in which the part is cut; there are two, if not three, nuclei in the funnel, one being in the projecting part of the lip. The postseptal portion is about 150μ long; its apparent width depends on the plane in which it is cut—from 65 to 90μ. The duct, given off from the hinder end of the organ, leads downwards or downwards and forwards.

The cerebral ganglion (Fig. 12) is as broad as it is long, indented in front and behind, the sides converging forwards; the breadth at the widest part exceeds that at the anterior end in the ratio 40 : 27.

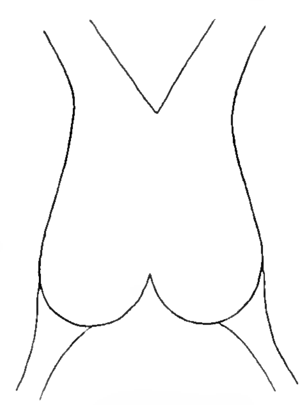

Fig. 12. *Enchytraeus colpites*; cerebral ganglion.

The proper testes are quite small, situated anteriorly and ventrally in segment xi, and cut up into a number of irregular, small, ovoid or shortly cylindrical lobes, which in many cases are seen to be surrounded by a delicate membrane. The testes consist only of sexual cells which have not begun to divide to form morulae; they differ altogether from the lobed ("divided") testes of the genus *Lumbricillus*, where the numerous large club-shaped lobes, each surrounded by a membrane, consist of undifferentiated sexual cells along with all stages—morulae, spermatids and spermatozoa—of their subsequent development. In the present species male cells in all stages of development are found free in the cavity of segment xi, in such quantities as to bulge septum 10/11 forwards or 11/12 backwards. What happens therefore is that the enclosing membrane disappears at an early stage, and the lobes of the testis shed their cells into the body-cavity, where their ripening takes place.

The male funnels are of moderately large size, about 5 or 6 times as long as broad,

with a small everted rim at the mouth. In one specimen a rudimentary third funnel was seen, as a small bud on the side of one of the larger ones. I do not remember noticing this particular abnormality before. The vas deferens, 20μ in diameter, forms a close coil on each side, which may extend into the hinder half of the segment amongst the large ova.

The penial body is of the enchytraeine rather than of the lumbricilline type. It consists of a number of pear-shaped masses of gland cells, about eight such masses being visible in a single longitudinal section, and the total number on each side being perhaps in the neighbourhood of two dozen. These gland masses are closely compacted together, separated, however, from each other by, and each individual pear-shaped mass more or less enveloped in, muscular strands; there is no common capsule binding the whole together, and the upper (dorsal) ends of the masses are without covering. The glands are composed of cells derived from the surface epithelium, and discharge on the surface around the small aperture of the vas deferens, which comes to the surface after passing between the glandular masses. The muscular fibres which intervene between the gland masses belong to a numerous series of oblique strands which pass upwards from the neighbourhood of the male pore to the body-wall in the more dorsal part of the segment; a number of such strands occur also in segment xiii.

The spermathecal ampulla (Fig. 13) is elongated, pear-shaped, and passes without any sharp demarcation into the duct; it communicates with the oesophagus by a passage, which can sometimes be seen to be patent, and is no doubt always so at some time of the sexual history of the animal; from some of the sections it appears as if the connection with the oesophagus were effected by means of a special diverticulum of the ampulla. The portion of the apparatus which serves as duct is curved; it has around its ectal end a number of small pear-shaped glands. These glands are derived from the surface epithelium in the immediate neighbourhood of the aperture, where they discharge, and are not, as is usually the case, cells of the lining epithelium of the duct which have elongated and burst through the muscular coat of the duct wall; they are three or four in number on each side—perhaps sometimes even fewer.

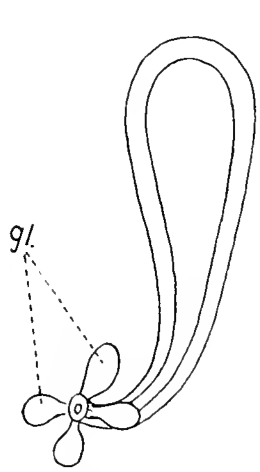

Fig. 13. *Enchytraeus colpites*; spermatheca. *gl.* glands at ectal end.

Copulatory glands are present and of moderately large size in segment xiv, spreading out to a distance of about 80μ on each side of the cord, but they do not cover its dorsal surface. In xiii are smaller glands, as also in xi and x; these last (in x) are very small.

The present species occupies (like quite a number of other forms) a position between the genera *Enchytraeus* and *Lumbricillus*. Allying it with *Lumbricillus* are the lumbricilline setae, the red blood, and the postpharyngeal bulbs which replace the salivary glands; copulatory glands are also general in *Lumbricillus*, exceptional in *Enchytraeus*. But the most distinctive characters of the genus *Lumbricillus*—the numerous and large pear-shaped testicular lobes or sacs, each enclosing within a membrane all stages in the

development of the male cells, and the compact, ovoid, and encapsuled penial body with characteristic structure are absent, and are represented by the less specialized conditions found in *Enchytraeus*.

The specific name is taken from the Greek κολπίτης, dwelling on a bay (κόλπος).

Genus Michaelsena, Ude

Michaelsena monochaeta (Michaelsen) (Fig. 14).

Enchytraeus monochaetus, Michaelsen, 1888, p. 66, fig. 6 *a–c*.

St. 159. 21. i. 27. 53° 52′ 30″ S, 36° 08′ 00″ W; depth of net 160 m. Net DLH (large dredge, heavy pattern). About a dozen small worms or fragments of worms, mostly bent or twisted.

The species was described by Michaelsen as long ago as 1888 from specimens taken in South Georgia. Identification is easy, by means of the setae. These conform entirely to Michaelsen's description—a single seta only per bundle, the ventral setae beginning in segment v, the lateral in xvii or thereabouts; I find a slight distal curve in some (lumbricilline setae). The spermathecae (Fig. 14) show a broadly pear-shaped ampulla with patent communication, somewhat drawn out, with the oesophagus; the duct is sharply separate, as long as the ampulla.

Owing to the internal degeneration in the genital segments and the generally unfavourable condition of the worms, I am unable to describe completely the penial body, concerning which Michaelsen has not given us any information. The vas deferens appears to pass backwards in numerous windings for several segments, I think as far as segment xiv; the penial body seems to have possessed a muscular capsule, and not to have consisted of discrete masses of gland cells after the manner of *E. albidus*.

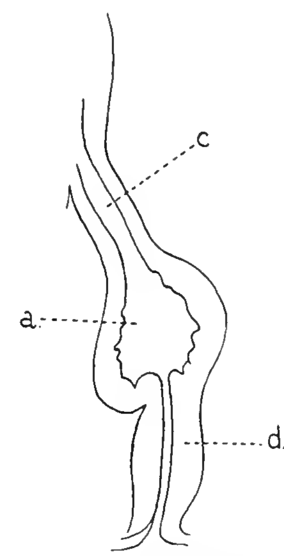

Fig. 14. *Michaelsena monochaeta*; spermatheca. *a*. ampulla; *c*. communication with oesophagus; *d*. duct.

The locality of the specimens deserves a word of note; they were dredged from 160 m.—a very unusual depth for Oligochaetes, which are usually confined to the shore and seldom stray out to sea. Michaelsen's specimens were found with *Marionina georgiana* about low-water mark, in shaly detritus, among the roots of seaweeds, and in the canal system of sponges. Another species of the genus, *M. macrochaeta* (Bay of Naples, coast of Ireland), lives, like the specimens of the present collection, below low-water mark.

Genus Achaeta, Vejd.

St. MS 71. 9. iii. 26. From moss between Grytviken and Maiviken, East Cumberland Bay, South Georgia. A single specimen; along with *Marionina georgiana*.

The interior of the single specimen was much disorganized, and specific determination was impossible.

The genus is known from Europe and New Zealand, but not hitherto from more southerly regions.

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[*Discovery Reports. Vol. IV, pp.* 265–290, *May*, 1932.]

OLIGOCHAETA

PART II. EARTHWORMS

By

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Osborn Zoological Laboratory, Yale University

CONTENTS

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(Text-figs. 1–3)

INTRODUCTION

THE collection of earthworms made by the Discovery Expedition comprises fifteen species from five major localities, viz. the islands of Annobon in the Gulf of Guinea, Tristan da Cunha, South Georgia, the Falkland Islands and Hermite Island, Cape Horn.

From Annobon only one species was obtained, *Dichogaster bolani* var.; it is not the same as the form of this species previously recorded from the island (see p. 287), but since this species is a peregrine of wide distribution in warm countries there is nothing remarkable in this. Apparently no other species of earthworm has so far been recorded from Annobon.

From Tristan da Cunha only five peregrine Lumbricids were obtained; this is to be expected from a volcanic, oceanic island. It is interesting to find that one of these species, *Lumbricus rubellus*, apparently forms a distinct race on the island (see p. 289). In the collection of the South African Museum, Cape Town, there are specimens from Tristan da Cunha (examined by myself) of two of the species here recorded, viz. *Allolobophora caliginosa* and *Lumbricus rubellus*. Apparently no other collections of earthworms from the island have as yet been examined.

From the island of South Georgia only one species is recorded, *Microscolex georgianus*; this species occurred abundantly in the collections made by the Discovery Expedition in various parts of the island. This species is endemic to South Georgia, but is closely allied to species from the Falkland Islands (a variety, var. *laevis*, is described by Rosa[1] from Patagonia, but is of doubtful status). An extremely interesting new form of *M. georgianus* occurred together with the typical form from one locality in the present collections; in this form microscolecine reduction has occurred without affecting any other characters.

From the Falkland Islands two endemic species of *Microscolex*, and two peregrine Lumbricids, viz. *Dendrobaena subrubicunda* and *Bimastus tenuis*, were found in the present collections. The latter are of especial interest in that they both show a peculiar restriction of the gizzard to segment 17. Michaelsen[2] has previously recorded *D. subrubicunda* from this locality, but does not comment on the position of the gizzard. Of

[1] Rosa, *Atti. Soc. Modena* (4), IV, p. 9.

[2] Michaelsen, W., *Ergeb. Hamb. Magalh. Sammelr.*, *Terricolen* (Nachtrag), p. 27.

the two species of *Microscolex*, one is the well-known endemic, *M. falclandicus*; the other is apparently referable to the less-known species *M. aquarumdulcium*. Two other species of this genus have previously been recorded from the Falkland Islands, viz. *M. anderssoni*, Mich., and *M. bovei* (Rosa); the former is possibly synonymous with *M. aquarumdulcium* (see p. 274) and is an endemic; the latter has also been recorded from a large number of localities around Cape Horn. *Chilota dalei* (Bedd.), the fifth Falkland Islands endemic, did not occur in the present collections.

From Hermite Island, Cape Horn, five well-known acanthodriline species occurred in the present collection, all of them Patagonian, Chilean and Tierra del Fuegan endemics of more or less restricted range. With the exception of the specimens of *Microscolex michaelseni*, which appear to be referable to a new subspecies, there are no indications that these species from Hermite Island are in any way different from specimens of the corresponding species from the mainland or from adjacent islands.

A list of the species recorded from the present collections is appended below. A complete review of the earthworm fauna of the Neotropical Region as known up to the year 1905 is given by Cognetti[1]; more recent contributions, when relevant, are discussed under the descriptions of the several species recorded in this communication.

LIST OF SPECIES

Family MEGASCOLECIDAE

Genus *Microscolex*, Rosa *em.* Mich.
- *M. falclandicus* (Bedd.), Falkland Islands.
- *M. aquarumdulcium* (Bedd.), Falkland Islands.
- *M. georgianus* (Mich.).
  - f. *georgianus*, South Georgia;
  - f. *reductus*, nov., South Georgia.
- *M. michaelseni*, Bedd.
  - *hermitensis*, subsp.n., Hermite Island, Cape Horn.

Genus *Chilota*, Mich.
- *Ch. bicinctus* (Bedd.), Hermite Island, Cape Horn.
- *Ch. patagonicus* (Kinb.), Hermite Island, Cape Horn.

Genus *Yagansia*, Mich.
- *Y. gracilis* (Bedd.), Hermite Island, Cape Horn.
- *Y. papillosus* (Bedd.), Hermite Island, Cape Horn.

Genus *Dichogaster*, Bedd.
- *D. bolani* (Mich.), var., Annobon.

Family LUMBRICIDAE

Genus *Eiseniella*, Mich.
- *E. tetraedra* (Sav.).
  - f. *typica* (Sav.), Tristan da Cunha.

[1] Cognetti de Martiis, L., *Mem. R. Acc. Sci. Torino* (2), LX, 1905.

Genus *Eisenia*, Malm. *em.* Mich.
E. rosea (Sav.), Tristan da Cunha.

Genus *Allolobophora*, Eisen *em.* Rosa.
A. caliginosa (Sav.), Tristan da Cunha.

Genus *Dendrobaena*, Eisen *em.* Rosa.
D. subrubicunda (Eisen), Falkland Islands.

Genus *Bimastus*, Moore.
B. tenuis (Eisen), Falkland Islands, Tristan da Cunha.

Genus *Lumbricus*, L.
L. rubellus, Hoffm.
f. *tristani*, nov., Tristan da Cunha.

SYSTEMATIC

Family MEGASCOLECIDAE

Sub-family *ACANTHODRILINAE*

Sectio Acanthodrilacea

Genus **Microscolex**, Rosa *em.* Mich.

Microscolex falclandicus (Bedd.) (Fig. 1 *g–k*).

Acanthodrilus georgianus (part), Beddard, 1890, *Quart. Journ. Micr. Sci.*, N.S., xxx, 4, p. 421, pl. xxx, figs. 15, 16, 22, 30, 32–5.

A. falclandicus, Beddard, 1893, *Proc. Zool. Soc. London*, 1892, p. 678.

Notiodrilus falclandicus, Michaelsen, 1899, *Ergeb. Hamb. Magalh. Sammelr.*, *Terricolen* (Nachtrag), p. 5. Hamburg.

Notiodrilus falclandicus, Michaelsen, 1900, *Das Tierreich*, x, *Oligochaeta*, p. 131.

Microscolex falclandicus, Michaelsen, 1905, *Wiss. Ergeb. d. Schwed. Südpolar-Exp.* 1901–3, *Oligochaeten*, v, 3, p. 10. Stockholm.

Teal Inlet, Falkland Islands, 5. iii. 27; six clitellate, ten non-clitellate semi-mature and immature specimens.

External characters. Length, clitellate specimens, 75–110 mm. Maximum diameter, clitellate specimens, $2\frac{3}{4}$–4 mm. Colour unpigmented, pallid whitish or cream-coloured.

Prostomium epilobic with or without one or two transverse furrows, rather variable in extent. Clitellum, $\frac{2}{3}$ or $\frac{1}{2}$13–16 dorsally, extending laterally to setal line *a*, not complete ventrally as described for the type specimens. Copulatory papillae, variously placed paired or median ventrally on segments 16 or 17–20 or 21, sometimes small papillae near the spermathecal pores. Dorsal pores absent. Nephridial pores very slightly below setal line *c* on the anterior border of the segments, not directly in front of *c* as described for the types. Female pores paired, in front of and very slightly lateral to the ventral setae *aa*, on segment 14. Spermathecal pores at intersegments 7/8 and 8/9 in setal line *b*.

The other external characters are in essential agreement with those specified for the types.

Internal characters. Lateral hearts three pairs in segments 10–12, not five pairs in segments 9–13 as described for the types. Intestine apparently without trace of typhlosole. Nephridia with large terminal vesicles. Seminal vesicles two pairs in segments 11 and 12 as described for the types; the so-called median ventral seminal vesicle described by Beddard appears to be merely a thin-walled sub-oesophageal coelomic chamber. Ovisacs present, moderately large.

The prostates usually extend back through 3–5 segments; in one specimen the anterior prostates were very reduced and only occupied one segment. The duct is confined to the first prostatic segment and is moderately long and coiled; near the gland it is very thin, but the ectal half is thicker and muscular. The gland is thick, tubular and irregularly bent, occupying the remaining 2–4 prostatic segments.

The penial setal sac muscles originate from the body-wall of the segment in which they lie. Penial setae of two sorts, as originally described by Beddard. The dimensions of fully grown setae from both the *a* and *b* bundles are about the same (length *ca.* 1·5 mm., maximum diameter near the base *ca.* 38μ, in middle of stem 27·5μ, at distal end just below point where seta begins to taper abruptly *ca.* 11–12μ). In both the stem is almost straight, and tapers to a filiform point. In the *a* setae the distal end is spirally curved through about 1–1½ revolutions, the direction of the spiral is the same as that of the ornamentation described below. In both setae the distal end of the stem is ornamented, but the type of ornamentation differs. In the *a* bundle (Fig. 1 *h*, *i*) the ornamentation begins with single, more or less regularly placed teeth around the stem, these give place to a spiral row of about thirteen scalloped knobs which pass up nearly to the point where the seta begins to taper and then stop abruptly; the distal extremity beyond this is ornamented with a few very fine teeth. The spiral line of knobs completes one extended revolution; in setae from the right side the spiral is clockwise, in setae from the left side it is anti-clockwise. In the *b* bundle (Fig. 1 *k*) the distal part of the stem, almost up to the point where the seta begins to taper, is ornamented with more or less regularly placed single or double teeth; these setae are presumably identical with the "smooth" type described by Beddard, since the *a* setae agree with his description and figure of the knobbed type. In Beddard's figure the extreme distal end of both types of setae is shown to terminate in a round knob; in all specimens examined by me the distal end is filiform as described above. Such a knob was occasionally observed in the rather similar penial setae of the *b* bundle in *M. georgianus*. In a juvenile specimen the precursory penial setae (Fig. 1 *i*, *j*) were found to be more or less of the adult type but shorter, more slender and with less pronounced ornamentation.

The spermathecae are very similar to those of *M. georgianus* with two unstalked narrowly pear-shaped diverticula, and a somewhat larger pear-shaped ampulla passing gradually into a stout duct which receives the diverticula.

Paired septal organs occur, as described by Beddard, from about septum 23/24 backwards; they usually hang backwards into the segment behind, but may occasionally project forwards instead; the size is very variable.

The internal characters are otherwise in agreement with those specified for the types.

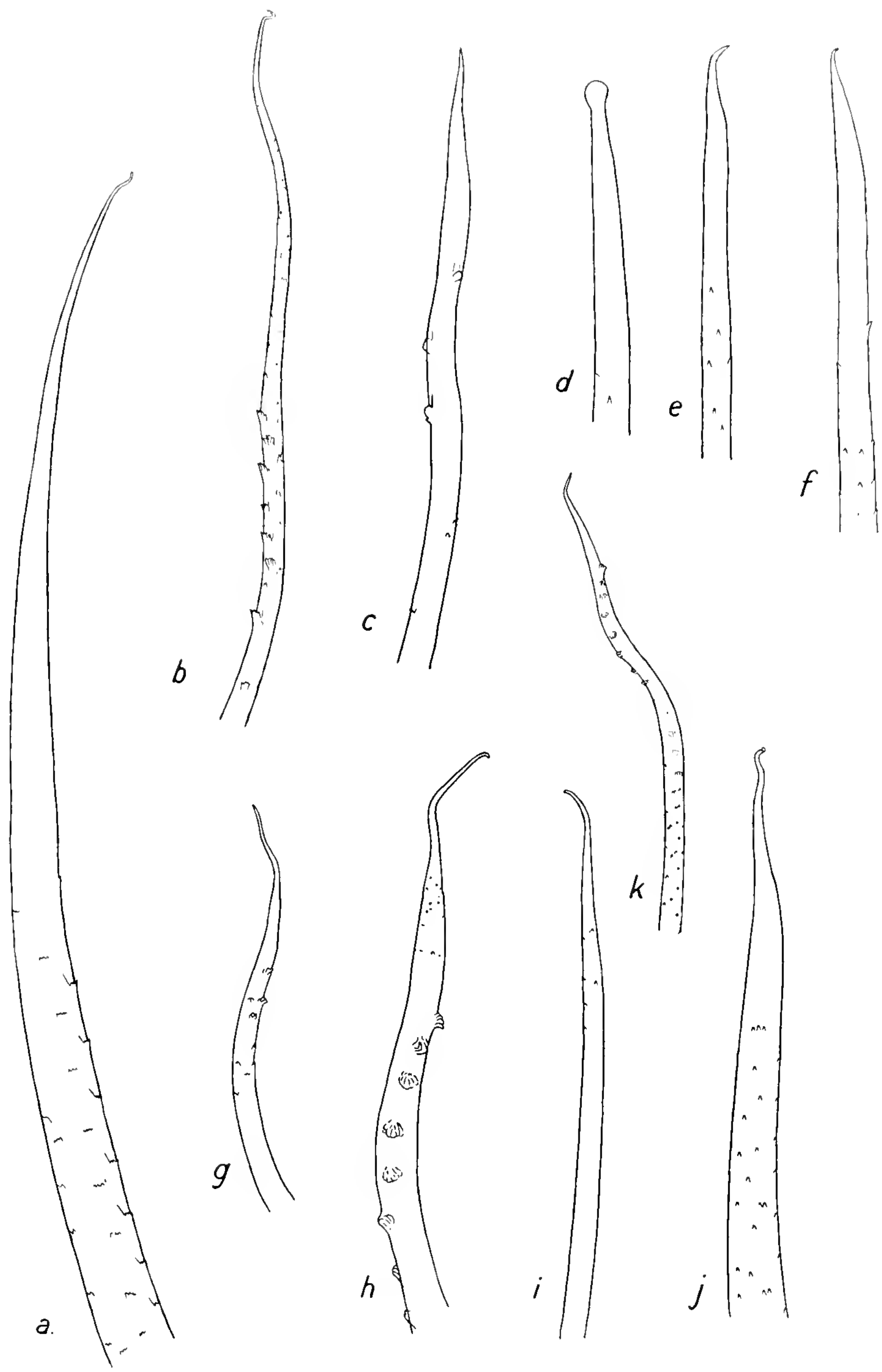

Fig. 1.

Microscolex aquarumdulcium (Bedd.). *a*. Distal end of a penial seta *b*, × 400. *b*. Distal end of a penial seta *a*, × 400.

Microscolex georgianus (Mich.). *c*. Distal end of a penial seta *a* from a right anterior bundle: the direction of the spiral formed by the three large scales is anti-clockwise, the greater part of the second scale lying on the under side of the seta in the figure, × 400. *d*. Distal end of an abnormal penial seta *b*, × 400. *e*, *f*. Distal ends of normal penial setae *b*, × 400.

Microscolex falclandicus (Bedd.). *g*. Distal end of a precursory penial seta *a*, from a right anterior bundle, × 400. *h*. Distal end of adult penial seta *a*, from a right posterior bundle; the direction of the spiral formed by the large knobbed scales is clockwise, the scales indicated by dots lie on the under side of the seta in the figure, × 150. *i*. Extreme distal end of same seta, × 400. *j*. Distal end of a precursory penial seta *b*, × 400. *k*. Distal end of an adult penial seta *b*, × 400.

Observations. In his original description Beddard referred this species to *Acanthodrilus georgianus* of Michaelsen. In the same year Michaelsen[1] re-described *A. georgianus* and pointed out that Beddard's specimens from the Falkland Islands differed in several respects from this species. Michaelsen suggested that Beddard's specimens were not *A. georgianus*, but were identical with *A. bovei* of Rosa. Beddard later (1893) accepted Michaelsen's first suggestion and referred these specimens to a new species, *A. falclandicus*. According to these authors *M. falclandicus* differs from *M. georgianus* in the following characters:

(1) The intersetal distance *cd* is markedly greater than *ab*.
(2) The nephridiopores are in setal line *c*, not slightly below it.
(3) The gizzard is rudimentary, not absent.
(4) The penial setae are different.

As regards the first character new material of *M. georgianus* described in the present investigation shows that the intersetal ratios are subject to great variation and may frequently be the same as in specimens of *M. falclandicus*. The nephridial pores of *M. falclandicus*, though never as markedly below the setal line *c* as in *M. georgianus*, are usually slightly so, and this character is therefore unreliable for diagnosis. The difference between a rudimentary gizzard and one which is "totally absent" is also very deceptive as a diagnostic character. The only character which can be relied on in the separation of these species is therefore that of the penial setae. Since the earlier descriptions were incomplete the penial setae of the two species are re-described and figured in the present communication. In both species the setae of the *a* and *b* bundles are of about the same dimensions, but differ in their ornamentation. The *b* setae of the two species are very similar; those of *M. georgianus* are shorter and slightly thinner, with ornamentation of the same type as in *M. falclandicus*, but the teeth fewer and further apart. It is in the *a* setae that the difference between the two species is most readily appreciated. As with the *b* setae, those of *M. georgianus* are shorter and somewhat more slender than those of *M. falclandicus*; in both species the distal end is slightly coiled through one revolution of a spiral and is ornamented with a spiral row of knobs; in *M. georgianus* these knobs are few in number (three or four), and either smooth or with a slightly serrated edge; in *M. falclandicus* there are a large number of knobs (*ca.* thirteen) and these are prominently scalloped; in *M. georgianus* the direction of the spiral is anti-clockwise on the right and clockwise on the left, in *M. falclandicus* the reverse is the case.

Both these species are also very close to *M. aquarumdulcium* and *M. anderssoni*, but may be distinguished by the form of the penial setae. In the two latter species (if they are not identical) the *a* setae are considerably more slender than the *b* and show no spiral ornamentation.

[1] Michaelsen, W., *Jahrb. d. Hamb. Wissensch. Anst.*, VII, 1889, p. 57.

Microscolex aquarumdulcium (Bedd.) (Fig. 1 *a*, *b*).

Acanthodrilus georgianus (part.), Beddard, 1890, *Quart. Journ. Micr. Sci.*, N.S., XXX, 4, p. 421.

A. aquarum-dulcium, Beddard, 1893, *Proc. Zool. Soc. London*, 1892, p. 680.

Notiodrilus aquarumdulcium, Michaelsen, 1899, *Ergeb. Hamb. Magalh. Sammelr.*, *Terricolen* (Nachtrag), p. 5. Hamburg.

N. aquarumdulcium, Michaelsen, 1900, *Das Tierreich*, X, *Oligochaeta*, p. 138.

Microscolex aquarumdulcium, Michaelsen, 1907, *Die Fauna Südwest-Australiens*, I, 2, p. 143. Jena.

? *M. anderssoni*, Michaelsen, 1905, *Wiss. Ergeb. d. Schwed. Südpolar-Exp.* 1901–3, V, 3, p. 8. Stockholm.

Teal Inlet, Falkland Islands, 5. iii. 27; four clitellate and one immature specimen.

External characters. Length of clitellate specimens, 84–108 mm.; maximum diameter, 2–2·5 mm. Colour pallid, unpigmented.

Prostomium epilobic, with or without a transverse furrow. Clitellum $\frac{2}{3}$13–16 dorsally, extending laterally to setal line *a*. Copulatory papillae variously placed, paired or single, lateral or ventral papillae on segments 15–20; or at the intersegments in this region. Dorsal pores absent. Nephridial pores in or very slightly below setal line *c* on the anterior borders of the segments. Spermathecal pores, two pairs at intersegments 7/8 and 8/9 in setal line *b*. Female pores, one pair on segment 14, in front of and very slightly external to the ventral setae (*aa*) on each side. Prostatic pores, two pairs on segments 17 and 19, on small papillae situated at the ends of the seminal grooves somewhat external to setal line *b* on each side. Male pores, one pair on segment 18, just external to seta *b* on each side and lying in the seminal grooves. Seminal grooves straight and very deep, between swollen walls. Intersetal distances, $aa : ab : bc : cd : dd =$ at the anterior end, approximately $1\frac{1}{2} : 1 : 1\frac{1}{6} : 1\frac{1}{4} : 2\frac{1}{2}$, $dd = \frac{2}{9}\,u$; at the posterior end, $1\frac{1}{3} : 1 : 1\frac{1}{4} : 1\frac{1}{3} : 2$, $dd = \frac{2}{9}\,u$.

Internal characters. Gizzard very reduced, in segment 5. Salivary glands extend back dorsally into segment 6 or 7. Intestine commences in segment 16; typhlosole absent. Lateral hearts, three pairs in segments 10–12. Nephridia with large terminal vesicles. Septal organs present as in *M. falclandicus*, from about septum 24/25 on, sometimes very reduced and sometimes projecting forwards instead of backwards. Testes and spermiducal funnels, two pairs, free, in segments 10 and 11. Seminal vesicles, two pairs in segments 11 and 12, depending from septa 10/11 and 11/12 respectively, lobulate. Ovaries, one pair in segment 13, fan-shaped, many-fingered. Ovisacs present in segment 14 from septum 13/14.

Prostates occupying 6 to 9 segments each, of which the duct usually occupies the first two, occasionally only the first. The gland is more or less straight or irregularly bent; near the gland the first third of the duct is thin and coiled once or twice; the remaining two-thirds of the duct is thick, muscular, and curved in the form of a semicircle. There are normally two pairs of well-developed prostates; in one specimen the left anterior prostate is very much reduced, and penial or ventral sigmoid setae are missing. In a

second specimen on the right side the posterior prostate is very reduced and confined to one segment, and the short gland is doubled back on the duct. The penial setal sac muscles originate from the body-wall of segment 19 near the posterior septum and the bundles of setae lie irregularly, the *b* bundle twisted in front of the *a* and pointing up instead of downwards. On the left side a similar condition prevails except that the prostate is apparently entirely absent. The penial setae are apparently normal.

Penial setal sac muscles originate, in part, from the body wall of the segment in which they lie, and in part fibres pass back with the prostatic gland and appear to enter the last septum through which the gland passes. Penial setae of two sorts, those of the *a* bundle more slender than those of the *b*. In the *a* setae the stem is straight except for the distal fourth which is strongly curved; the full-grown seta is about 1·5 mm. long and tapers very gradually to a filiform point. The distal end is ornamented on the inner side of the curvature with large, projecting, irregularly placed, serrate scales; these stop abruptly, and the tapering region beyond is ornamented with very fine, irregularly placed, simple or serrate teeth (Fig. 1 *b*); in the middle of the stem the diameter is from 12 to 14μ. In the *b* setae the stem is straight except at the distal end, which is slightly curved and tapers gradually to a filiform point; in this region the seta is quite smooth, but lower down it is ornamented at the distal end with alternating, serrate scales (Fig. 1 *a*); a full-grown seta is about 1·5 mm. long and in the middle region of the stem about 21·5μ in diameter.

Spermathecae, two pairs in segments 8 and 9, similar to those of *M. falclandicus* and *M. georgianus*.

Observations. Beddard's original description of *M. aquarumdulcium* is very inadequate, but it is probable that the specimens discussed above are correctly referred to this species. As stated by Beddard for the types of *M. aquarumdulcium*, these specimens are very similar to *M. falclandicus*, but more slender, and the body wall is thinner. Unlike the types these specimens are not smaller, but of about the same length as specimens of *M. falclandicus*; this character is of doubtful significance. Beddard evidently only observed the penial setae of the *b* bundle which he describes. In stating that the large tubercles of *M. falclandicus* are entirely absent he was in error, since the projecting serrate teeth of the *a* setae are not unlike those of the latter species.

This species is also in close agreement with *M. anderssoni* Mich. The prostatic duct is not in any sense of the word short as described for *M. anderssoni*, and the ornamentation of the penial setae seems to be somewhat different. It is quite possible that these differences are not significant and that the two species should be synonymized.

M. aquarumdulcium cannot be distinguished from *M. falclandicus* with any certainty on external characters. It is undoubtedly more slender and owing to the greater thinness of the body-wall the more extensive prostates can as a rule be seen from the outside. On internal characters it is chiefly distinguished by the greater extent of the prostates and by the form of the penial setae.

Microscolex georgianus, f. georgianus (Mich.) (Figs. 1 *c–f*, 3*a*).

Acanthodrilus georgianus, Michaelsen, 1888, *Jahrb. d. Hamb. Wissensch. Anst.*, V, 1887, p. 68, pl. 2, fig. 4 *a–d*.

Mandane georgiana, Michaelsen, 1889, *ibid.*, VI, 1888, p. 61.

Acanthodrilus georgianus, Michaelsen, 1890, *ibid.*, VII, 1889, p. 57.

Notiodrilus georgianus, Michaelsen, 1899, *Zool. Jahrb.*, *Syst.*, XII, p. 239.

N. georgianus, Michaelsen, 1900, *Das Tierreich*, X, *Oligochaeta*, p. 130.

Microscolex (*Notiodrilus*) *georgianus*, Michaelsen, 1905, *Deutsch. Südpolar-Exp.* 1901–3, *Oligochaeten*, IX, Zool., I, p. 54.

Microscolex georgianus, Michaelsen, 1905, *Wiss. Ergeb. d. Schwed. Südpolar-Exp.* 1901–3, V, 3, p. 11. Stockholm.

nec Acanthodrilus georgianus, Beddard, 1890, *Quart. Journ. Micr. Sci.*, N.S., XXX, 4, p. 421.

In earth half-way between Cairn and Maiviken, St. MS 70, South Georgia, 4. iii. 26; three clitellate and three non-clitellate semi-mature specimens. In wet moss 200 ft. above Upper Lake, St. 122, South Georgia, 14. xii. 26; four fully or partly clitellate and six non-clitellate semi-mature or immature specimens. Under stones near Upper Lake, St. 122, South Georgia, 14. xii. 26; five fully or partly clitellate, seven non-clitellate semi-mature and one immature specimen, one damaged anterior end and two posterior ends. Moss and *Acaena*, Larsen Harbour, South Georgia, 6. i. 27; seven clitellate and one immature specimen. River bank, Wilson Harbour, South Georgia, St. WS 62, 19. i. 27; fourteen clitellate, seven non-clitellate semi-mature and one immature specimen, and four fragments. From river bank, Undine Bay, South Georgia, St. 65, 22. i. 27; eighteen fully or partly clitellate specimens. Cumberland Bay, South Georgia, no date; twenty clitellate and semi-mature, nine immature specimens, in very poor preservation.

External characters. Length rather variable, 31–80 mm. Colour: usually tinged with reddish pigment dorsally at the anterior end, frequently very faint or absent, occasionally moderately deep.

Prostomium epilobic, with or without a cross-furrow; the extent of the tongue is very variable, in some specimens being almost tanylobic. Clitellum $\frac{1}{n}$13–$\frac{1}{n}$16, usually extending laterally to about setal line *a*; in a few specimens the line of demarcation is indefinite and the clitellum appears to extend ventrally on to segments 14 and 15. Copulatory papillae very variable, occasionally absent, frequently paired or single on one or other side on posterior border of segment 10 in the line of the ventral pair of setae; papillae are usually present, ventrally or laterally, in the region of segments 16–19, variously disposed either on the borders of the segments or across the intersegments. Dorsal pores absent. Nephridial pores about $\frac{1}{5}$ *bc* below setal line *c* on the anterior borders of the segments. Spermathecal pores, two pairs in setal line *b* at intersegments 7/8 and 8/9, either on conspicuous papillae or inconspicuous; this is apparently not correlated with the degree of maturity. Female pores one pair on segment 14 in front of seta *a* on each side. Intersetal ratios very variable; in some specimens *cd* may be about equal to *ab* as described for the types, but more usually *cd* is greater than *ab*. In general the ratios are more or less similar to those of *M. falclandicus*; this character is in any case too variable to be relied on in distinguishing the two species.

The other external characters are essentially as described for the type.

Internal characters. Gizzard absent. The salivary glands extend back dorsally over the pharynx into segment 6, 7 or 8. Intestine commences in segment 16, typhlosole absent. Lateral hearts, three pairs in segments 10–12. Nephridia with large terminal vesicles. Seminal vesicles, two pairs in segments 11 and 12. Ovisacs present or absent, occasionally present on one side only. Septal organs apparently absent.

Prostates, two pairs opening in segments 17 and 19 respectively. The duct is confined to the segment of the external opening; near the gland it is thin and coiled once or twice, near the external opening it is thicker, muscular and curved, but not coiled. The gland occupies 2–4 segments behind that in which the duct lies; it is thick, tubular, and irregularly twisted. Penial setal sac muscles originate from the body-wall of the segment to which they belong.

The penial setae of the *a* and *b* bundles are dissimilar. In all the adult specimens examined the penial setae appear to belong to the reserve bundle, in spite of the fact that the specimens were fully clitellate. All the dated collections were made in the summer months from December to January (one is undated), and the absence of full-grown functional setae would be explicable if this period were after or at the end of the breeding season. Without further collections at other times of the year it is impossible to decide on this point. In the reserve bundles the largest setae are apparently practically full grown and the measurements given below refer to such setae. Setae of the *b* bundle are from 0·45 to 0·6 mm. long, about 23μ in diameter at the base, 17 narrowing to 14μ in the middle of the stem and about 9μ at the distal end just below where the seta begins to taper rapidly. The stem is practically straight, tapering very gradually from the base nearly to the distal end and then tapering rapidly to a filiform point. In a few cases the distal end terminates in a rounded, more or less flattened knob (Fig. 1 *d*), apparently the result of a deformity. The distal end of the stem is ornamented with a few scattered single teeth (Fig. 1 *e*, *f*). In setae of the *a* bundle the length varies from 0·43 to 0·57 mm., the stem is straight except at the distal end and the diameter in the various regions is about the same as in setae of the *b* bundle. The distal end of the *a* setae is spirally coiled through not more than one revolution; the direction of the spiral is the same as that of the ornamentation described below, but the coiling is not very well marked. At the extreme distal end the seta tapers abruptly to a filiform point as in setae of the *b* bundle. The ornamentation (Fig. 1 *c*) commences just below the region of spiral curvature with a few irregularly placed single teeth; this is succeeded by a row of three or four large knobs which follow a spiral line round the stem. In setae from the right side the direction of the spiral is anti-clockwise, from the left side clockwise; this is the opposite of the condition in *M. falclandicus*. The knobs are either smooth or serrated along the edge, never markedly scalloped as in *M. falclandicus*. Michaelsen, in his original description, appears to have mistaken the relatively smooth setae of the *b* bundle for reserve setae.

Spermathecae two pairs in segments 8 and 9, similar to those of *M. falclandicus* and *M. aquarumdulcium*. The pear-shaped ampulla is not sharply separated from a short, stout duct, which receives two unstalked simple diverticula near the ampulla

(Fig. 3 *a*). The remaining internal characters are essentially as described for the type specimens.

Abnormal specimens. Two abnormal specimens were encountered in the collections of *M. georgianus*. Since such abnormalities are of frequent occurrence in Oligochaetes and have been made the subject of special study by various authors (the literature is reviewed by Stephenson[1]), it is only desirable here to indicate the main external features of these specimens.

In a clitellate specimen from Larsen Harbour, 6. i. 27, the left side of the animal is entirely normal but the right shows several abnormalities. Segment 9 is divided by a furrow on the right side, and there are three spermathecal pores beginning at intersegment 8/9. The right female pore is on segment 15 instead of 14. Segment 18 is also divided by a furrow on the right side, and there are three prostatic pores on segments 18, 20 and 21. There is no seminal groove in connection with the first of these; from the second a groove extends half a segment forward and from the third half a segment backwards. No male pore or pores can be seen externally on the right side. The clitellum is also peculiar on the right side, extending over segments 14–17 continuously, absent on 18, and recurring again on segment 19.

In a poorly preserved specimen from Wilson Harbour, 19. i. 27, an even more abnormal condition is found. Segments 1–3 appear to be normal, segments 4–7 are so subdivided by spiral furrows as to be quite confused. There are three pairs of spermathecal pores immediately behind this region. If the first spermathecal pore is assumed to be at intersegment 7/8, then the next two are at intersegments 9/10 and 10/11 respectively. The clitellum is apparently normally situated in reference to this region, on segments 14–16, but it is poorly defined and owing to bad preservation the female pores are not visible. The prostatic pores are situated very far back and are abnormally arranged. On segment 26 (on the assumption previously indicated) there is a pair of prostatic pores; on 27 a second prostatic pore on the right and a male pore on the left; on 28 a prostatic pore on the left and a male pore on the right; on 29 what appears to be an additional male pore on the left and a third prostatic pore on the right; on 30 apparently a small pair of prostatic pores. Either serial sections or careful dissection would be necessary to confirm these statements, but owing to the poor state of preservation no such examination has been attempted.

Observations. This species is exceedingly close both to *M. falclandicus* and to *M. aquarumdulcium* from the Falkland Islands. The differences separating these species are discussed under *M. falclandicus*.

f. reductus, nov.

In wet moss 200 ft. above Upper Lake, St. 122, South Georgia, 14. xii. 26; one fully, one partly clitellate and one non-clitellate semi-mature specimen (*type* and *paratypes*).

These specimens only differ from the typical form in the absence of the posterior pair of prostates and penial setae; they are in essential agreement with f. *georgianus* in all

[1] Stephenson, J., *The Oligochaeta*, Oxford, 1931.

other characters specified in the present and in previous descriptions of the species. It is remarkable that microscolecine reduction of the prostates should have occurred without involving any other characters, even the posterior pair of spermathecae being normally developed.

Length 37–40 mm. Colour slightly pigmented greyish brown dorsally and ventrally at the anterior end. Prostomium schizo-epilobic. Clitellum 13–16; in the fully clitellate specimen the clitellum is complete but much less swollen ventrally. Copulatory papillae absent in two specimens; in the fully clitellate specimen there is a papilla on segment 16 on the right side on the posterior border in setal line *a*, also swollen areas without definite papillae ventrally on segments 16–18.

Microscolex michaelseni, Bedd., **hermitensis**, subsp.n. (Fig. 2 *a*, *b*).

St. 222, St Martin's Cove, Hermite Island, Cape Horn, 23. iv. 27, under logs and stones; three mature specimens in very poor preservation (*cotypes*).

Length (two uninjured specimens) 73 and 75 mm. Colour very slightly tinged with red-brown pigment dorsally at the anterior end.

Clitellum saddle-shaped, from about 14–16. Copulatory papillae apparently absent, but the state of preservation does not permit certainty. Dorsal pores absent. Intersetal ratios, *aa* : *ab* : *bc* : *cd* : *dd*, at anterior end approximately 1·5 : 1 : 1·5 : 1·5 : 2, $dd = ca. \frac{1}{5}u$; at posterior end, approximately, $1\frac{1}{4} : 1 : 1 : 1 : 2$, $dd = ca. \frac{2}{9}u$.

The gizzard, as far as the state of preservation allows determination, appears to be quite absent. Salivary glands extend into segment 7 dorsally over the pharynx. Testes and spermiducal funnels, only one pair, in segment 10; there was no trace of a rudimentary second pair in 11 in any of the three specimens.

Prostates occupying 3–5 segments each. The duct is long and somewhat coiled, thicker near the external opening, thinner near the gland, from which it is sharply separated. The duct occupies the first or first and second segments, the short, coiled, tubular gland the remaining two or three segments.

Penial setal sac muscles originate from the body wall at the first intersegment behind their respective prostatic pores.

Penial setae in two dissimilar sub-bundles. The setae of the two bundles are of approximately the same length (0·9–1·6 mm.) but those of the *a* bundle are more slender than those of the *b* in any given specimen, although the range in diameter actually overlaps (diameter near base, *a* *ca.* 20μ, *b* 18·5–21·5μ; in middle of stem, *a* 11–14μ, *b* 14–20μ). In general form the setae are as figured by Michaelsen for the types[1]; the setae of the *a* bundle taper very gradually, of the *b* bundle more rapidly to a filiform point. The setae of the *a* bundle agree with Michaelsen's more slender type in being ornamented at the distal end on the inner side of the curvature with prominent serrate teeth, the tapering point beyond the region of large teeth being ornamented with a few small irregular teeth or markings (Fig. 2 *b*). The setae of the *b* bundle differ from

[1] 1911. Michaelsen, W., *Zool. Jahrb., Abt. f. Syst.*, XXX, p. 567, pl. 15, figs. 10 and 11.

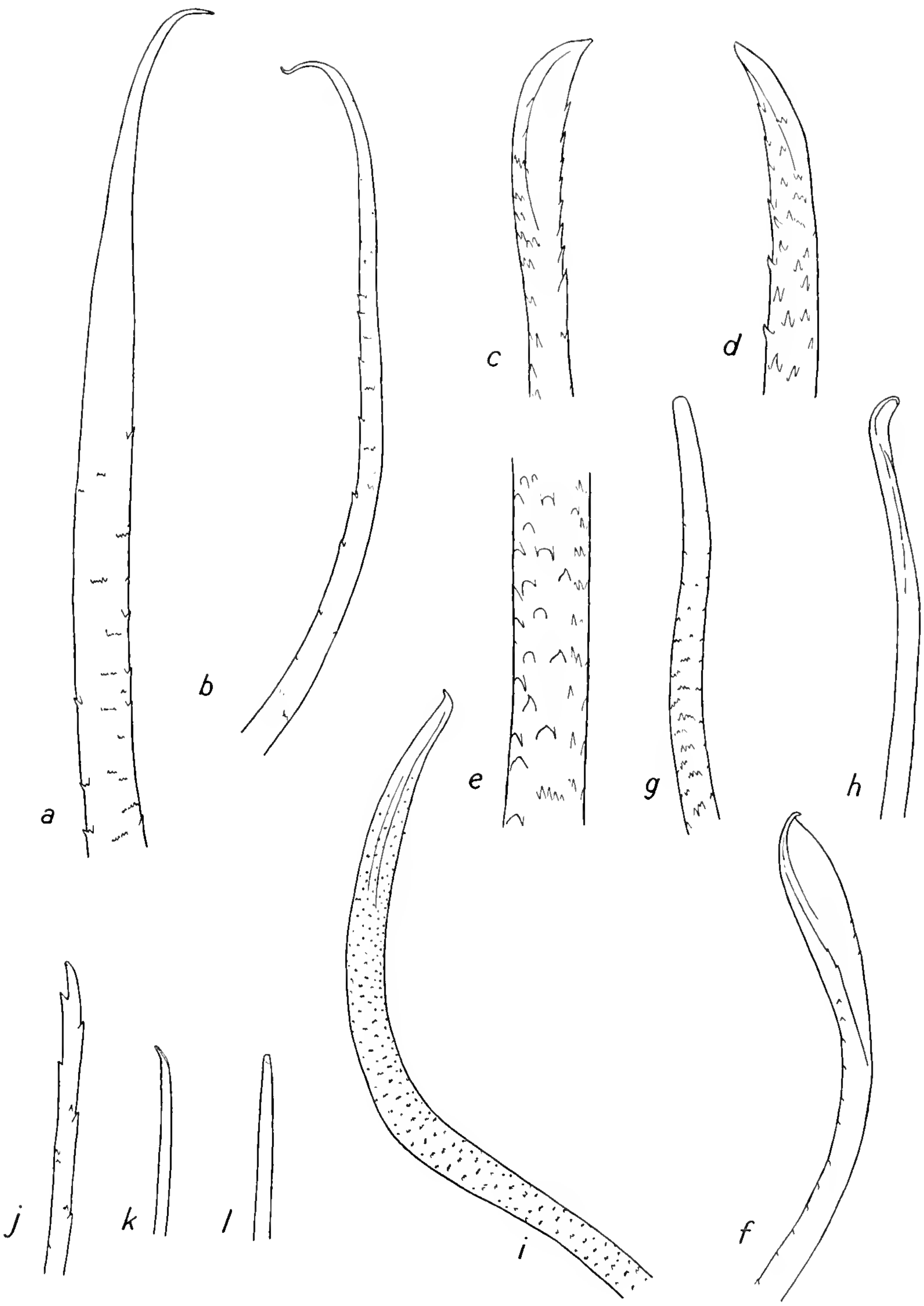

Fig. 2.

Microscolex michaelseni hermitensis subsp.n. *a*. Distal end of penial seta *b* of a cotype, × 400. *b*. Distal end of a penial seta *a* of a cotype, × 400.

Chilota bicinctus (Bedd.). *c*. Extreme distal end of a penial seta *b*, × 400. *d*. Extreme distal end of a penial seta *a*, × 400. *e*. Part of ornamented region of stem towards distal end of a penial seta *a*, × 400.

Chilota patagonicus (Kinb.). *f*. Distal end of a penial seta *a*, × 400.

Yagansia papillosus (Bedd.). *g*. Distal end of a penial seta *b*, × 400. *h*. Distal end of a penial seta *a*, × 400.

Yagansia gracilis (Bedd.). *i*. Distal end of a penial seta, × 150.

Dichogaster bolaui (Mich.). *j*. Distal end of a penial seta *a*, × 400. *k*. Distal end of a penial seta *b*, side view, × 400. *l*. Distal end of the same penial seta, face view, × 400.

those described by Michaelsen in being ornamented distally all round the stem with sparse serrated teeth or scales (Fig. 2 *a*). Since these stouter setae are definitely stated to be quite smooth, it would appear that these specimens differ from the types in this character.

In all other characters, both external and internal, these specimens are in essential agreement with the types of *M. michaelseni.*

Observations. Apart from the possibility that the types are really unpigmented and not merely faded these specimens only differ in the ornamentation of the penial setae of the outer sub-bundle. If these specimens constitute a race peculiar to Hermite Island they should be treated as a subspecies, but it is equally probable that they merely represent a variety not geographically separated from the type. In the absence of evidence to the contrary they have been treated above as representing a distinct subspecies.

Sectio CHILOTACEA

Genus **Chilota**, Mich.

Chilota bicinctus (Bedd.) (Fig. 2 *c–e*).

Acanthodrilus bicinctus + *A. purpureus*, Beddard, 1895, *Proc. Zool. Soc. London*, 1895, pp. 217, 218.

A. bicinctus + *A. dalei* (part), Beddard, 1896, *Ergeb. Hamb. Magalh. Sammelr., Naid. Tubif. Terric.*, p. 27, figs. 10 and 12, pp. 28 and 39.

A. purpureus, Michaelsen, 1898, *Zool. Jahrb.*, suppl. 4, p. 471.

Chilota bicincta, Michaelsen, 1899, *Ergeb. Hamb. Magalh. Sammelr., Terricolen* (Nachtrag), p. 17. Hamburg.

Ch. bicincta, Michaelsen, 1900, *Das Tierreich*, x, *Oligochaeta*, p. 148.

Ch. bicinctus, Michaelsen, 1923, *Göteborg. Vetensk-Samh. Handl.* (4), XXVII, Afd. 32, p. 4.

St. 222, St Martin's Cove, Hermite Island, Cape Horn, 23. iv. 27; three clitellate and one immature specimen, also three very immature specimens probably referable to this species; in rather poor preservation.

Length (two uninjured, clitellate specimens) 74 and 77 mm.

Clitellum, $\frac{1}{2}$13–16, or $\frac{1}{2}$17 dorsally, 14–16 ventrally. Copulatory papillae apparently absent, but state of preservation does not permit certainty on this point. Dorsal pores absent. Nephridial pores in setal line *c*, difficult to see. Spermathecal pores, two pairs, at intersegments 7/8 and 8/9 on papillae in setal line *b*. Prostatic pores, two pairs, on segments 17 and 19 in setal line *b* on papillae.

Gizzard in segment 5, small but muscular. Not in segment 7 as described for the types of "*Ac. purpureus*" by Beddard (the condition in the types of *Ac. bicinctus* is not mentioned). Salivary glands extend into segment 5. Intestine: the position of the first intestinal segment is apparently very variable; in one clitellate specimen it appeared to be in 19, in another in 20, and in the third in 23; in the immature specimen the state of preservation rendered it impossible to determine this point. Typhlosole absent. Lateral hearts: last pair in segment 12 as described for the type of "*Ac. purpureus*" but not specified for the types of *Ac. bicinctus*.

Nephridia: the terminal section of the duct proximal to the external pore is considerably dilated but does not form a large vesicle as for instance in *Ch. patagonica*; before entering the body-wall the duct is constricted again. Owing to poor preservation it is not possible to describe the condition more accurately. Seminal vesicles, two pairs, in segments 9 and 11, not one pair in segment 11 as described by Beddard for the types; the anterior pair is, however, very reduced and finely lobulate. Ovisacs present, in one specimen apparently on the left side only.

Prostates occupying five segments of which the first contains the moderately long, thin and sinuous duct. In one specimen both prostates are missing on the right side, and normal ventral sigmoid setae are present instead of penial setae.

Penial setal sac muscles pass backwards beside the prostatic glands and originate from the body-wall at the fourth intersegment behind their respective prostatic pores. Penial setae in two dissimilar sub-bundles, approximately as described and figured by Beddard. Setae of the *b* bundle are long and thin (3·3–3·4 mm. long, diameter near base *ca.* 34μ, in middle region of the stem very irregular *ca.* 20–23μ, at the distal end below the blade 11–12·5μ, breadth of blade 17–20μ, thickness *ca.* 4·5μ). About the distal two-fifths of the stem is ornamented with long, slender teeth, in groups of two or three or in longer rows, rarely singly; these are chiefly on the lateral and convex sides, not on the inner side of the curvature. On the blade the ornamentation continues on the convex side, but the concave side is smooth, and the sides of the blade are toothed. Contrary to Michaelsen's re-description the teeth just below the blade are not conspicuously stouter than the rest. The point of the blade is not as blunt as in Beddard's figure for that of a type (Fig. 2 *c*). The setae of the *a* bundle are somewhat stouter and only about half as long as those of the *b* bundle; the tip is slightly flattened, but not broadened, to form a scarcely differentiated blade which terminates in a blunt point (length *ca.* 1·8 mm., diameter near base 41–49μ, in middle region of stem 26–29μ, tapering at distal end to 15–17μ below the flattened tip, breadth of blade *ca.* 15·5μ, thickness *ca.* 6μ); distal third of stem ornamented on the concave side of the curvature with large blunt scales, or more distally with large pointed scales; on the convex side with slender pointed teeth, either singly or in rows of two, three or more (Fig. 2 *d*, *e*).

Spermathecae: the sperm chamber at the end of the long, thick stalk of the diverticulum is apparently only divided into a few rather large chambers, and does not consist of numerous chambers forming a mulberry-like head as described by Michaelsen (1923). This appearance may be merely the result of poor preservation and is, in any case, probably not a significant difference.

In other characters, both external and internal, as far as could be determined, these specimens are essentially in agreement with the types.

Observations. Except for the presence of seminal vesicles in segment 9 and the position of the gizzard in segment 5 instead of 7 these specimens agree very well with the descriptions of *Ch. bicinctus*. The possibility that Beddard was mistaken in both these observations cannot be overlooked, since the anterior seminal vesicles are very reduced and the position of the gizzard is always difficult to determine. Only a re-examination

of the types can confirm the identification of these specimens with *Ch. bicinctus*, but until this has been done it is not desirable to separate the former as representing a distinct species.

Chilota patagonicus (Kinb.) (Fig. 2 *f*).

For complete synonymy and bibliography up to 1900, see:

Chilota patagonica, Michaelsen, 1900, *Das Tierreich*, x, *Oligochaeta*, p. 155.

St. 222, St Martin's Cove, Hermite Island, Cape Horn, 23. iv. 27, under logs and stones; one immature specimen.

Nephridial pores very slightly below setal line *c*. Gizzard entirely in segment 5, not in 5 and 6 as stated for the type. Salivary glands stop at septum 4/5. Intestine widens in segment 16. Dorsal blood vessel single as in the smaller specimens described by Michaelsen[1], not double as in the typical specimens. Nephridia with well-developed terminal vesicles. Ovisacs apparently absent.

Prostates as coiled tubular glands confined to the segment in which they open to the exterior, the duct moderately short and thin, somewhat coiled. The posterior pair of prostates smaller than the anterior, as described by Michaelsen[2].

Penial setal sac muscles originate from the body-wall at the first intersegment behind their prostatic pore. Penial setae: those of the *a* and *b* bundles alike, essentially as described by Michaelsen. The dimensions are somewhat less than in the types (length 1·7–1·8 mm., diameter in mid-region of stem 19–23μ, just below blade 11–15μ), but since the specimen is immature this is not significant. At the extreme distal end below the blade the ornamentation is in the form of single teeth confined to the inner side of the curvature (Fig. 2 *f*); below this the ornamentation is in the form of rows or part rings of teeth and occurs on both sides of the stem.

Spermathecae: the anterior pair are smaller than the posterior. In other characters, as far as its degree of development permits determination, this specimen is in essential agreement with those specified for the type.

Genus **Yagansia**, Mich.

Yagansia gracilis (Bedd.) (Figs. 2 *i*, 3 *c*, *d*).

Microscolex gracilis, Beddard, 1895, *Proc. Zool. Soc. London*, 1895, p. 234.

Microscolex gracilis, Beddard, 1896, *Ergeb. Hamb. Magalh. Sammelr., Naid. Tubif. Terric.*, p. 54.

Yagansia gracilis, Michaelsen, 1899, *ibid.*, *Terricolen* (Nachtrag), p. 22. Hamburg.

Yagansia gracilis, Michaelsen, 1900, *Das Tierreich*, x, *Oligochaeta*, p. 160.

St. 222, St Martin's Cove, Hermite Island, Cape Horn, 400 ft. alt., 24. iv. 27; one clitellate specimen.

Length, 75 mm. Colour unpigmented, not dark purple as described by Beddard for the types. This may well be the result of fading, as has been discussed by Michaelsen (1899) for other specimens of this species.

[1] Michaelsen, W., *Zool. Jahrb.*, Suppl. 4, p. 472.

[2] *Id.*, *Jahrb. d. Hamb. Wissensch. Anst.*, VI, Zweite Hälfte (*Mitt. Mus. Hamb.*), p. 61.

Prostomium epilobic $\frac{1}{2}$. Clitellum $\frac{2}{3}13$–$\frac{2}{3}16$, complete ventrally. Copulatory papillae absent. Dorsal pores present from intersegment 8/9 backwards, except in the clitellar region where pores are apparently absent. Nephridial pores on the anterior

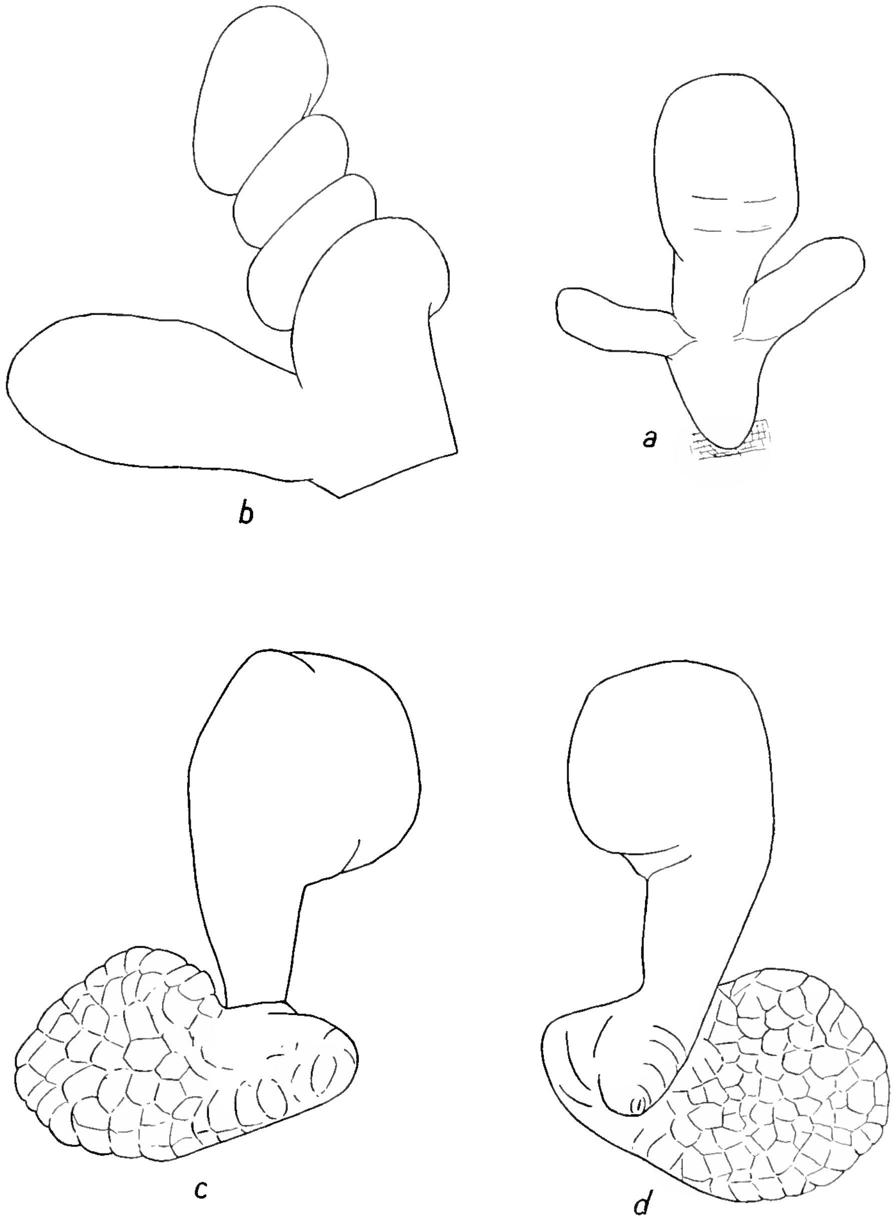

Fig. 3.

Microscolex georgianus (Mich.). *a*. Spermatheca, anterior view, × 40.

Yagansia papillosus (Bedd.). *b*. Left spermatheca, anterior view; the diverticulum is spirally coiled in a clockwise direction, × 40.

Yagansia gracilis (Bedd.). *c*. Right spermatheca, anterior view, × 40. *d*. The same spermatheca, posterior view, × 40.

borders of the segments, in or very slightly below setal line *c*. Female pores on segment 14, anterior and internal to the ventral setae (*aa*). Intersetal ratios: *aa* : *ab* : *bc* : *cd* : *dd* on segment 10 about $2 : 1 : 2 : 1\frac{2}{3} : 5$, $dd = ca.\ \frac{1}{3}u$; at posterior end, about $1\frac{1}{3} : 1 : 1\frac{1}{2} : 1 : 1\frac{2}{3}$, $dd = ca.\ \frac{1}{5}u$.

Gizzard large, cylindrical, in segment 6, not in segment 8 as described by Beddard for the types of this species. Salivary glands extend into segment 5. Intestine widens rather gradually from segment 17. Typhlosole absent. Lateral hearts, last pair in segment 12. Nephridia: the wide tube is L-shaped and the short limb of the L near the external opening is dilated to form a terminal vesicle. Ovaries very large, as originally described by Beddard. Ovisacs absent.

Seminal vesicles comprise two unusually small pairs in segments 9 and 11 respectively, not one pair in segment 11 as described for the types. Prostates occupying four segments each; the gland thick, tubular and coiled in one plane, beginning in the first prostatic segment; duct confined to the first prostatic segment, very thin, moderately long and coiled, sharply separated from the gland.

Penial setal sac muscles originate from the body-wall at the third intersegment behind the prostatic pores. Penial setae in two similar sub-bundles; the form of the seta is essentially in agreement with Beddard's description for the types. The ornamentation is as later described by Michaelsen (l. c.), except that the fine rows of teeth are not confined to the convex side of the curvature at the distal end but occur on both sides (Fig. 2 *i*). Below the flattened blade the setal stem is thickened. Dimensions, length *ca.* 2 mm.; diameter near base 31μ (*b*), *ca.* 42μ (*a*); in middle of stem 26–27μ (*b*), 28–29μ (*a*), in thickened region below blade 31–32μ (*a*), 35μ (*b*); thickness of blade 15·5μ narrowing to 7·5μ for both setae, breadth of blade *ca.* 34μ (only an *a* measured in face view).

Spermathecae as described for the types (Fig. 3 *c*, *d*).

In other characters essentially in agreement with previous descriptions.

Observations. This species is exceedingly close to *Y. diversicolor* (Bedd.) from which it was distinguished by Beddard by the form of the prostomium. The present specimen agrees with the description of *Y. diversicolor*, and differs from *Y. gracilis* in the position of the gizzard and in the presence of seminal vesicles in segment 9; the prostomium is, however, epilobic. Michaelsen expressly states that the penial setae of the two species are identical and in view of this it seems probable that these species are really synonymous or at any rate merely represent forms or subspecies. In the absence of further evidence the present specimen is referred to *Y. gracilis*, which has priority.

Yagansia papillosus (Bedd.) (Figs. 2 *g*, *h*, 3 *b*).

Microscolex papillosus, Beddard, 1895, *Proc. Zool. Soc. London*, 1895, p. 230.

Microscolex papillosus, Beddard, 1896, *Ergeb. Hamb. Magalh. Sammelr., Naid. Tubif. Terric.*, p. 50, figs. 1–4. Hamburg.

Yagansia papillosa, Michaelsen, 1899, *ibid.*, *Terricolen* (Nachtrag), p. 23.

Y. papillosa, Michaelsen, 1900, *Das Tierreich*, x, *Oligochaeta*, p. 161.

St. 222, St Martin's Cove, Hermite Island, Cape Horn, 23. iv. 27, under logs and stones; one clitellate specimen, in poor preservation.

Colour slightly pigmented dorsally at the anterior end. Prostomium epilobic. Clitellum extends over about 13–16, saddle-shaped, extending laterally to setal line *b*.

Copulatory papillae apparently absent. Dorsal pores absent. Gizzard small, cylindrical, muscular, in segment 5. Salivary glands stop at septum 4/5. Intestine widens from the oesophagus in segment 18, not in 17 as described by Beddard for a type specimen. This character is probably variable, as in the three specimens of *Microscolex michaelseni hermitensis* described above. Typhlosole absent. Lateral hearts, last pair in segment 11. Nephridia with small pear-shaped terminal vesicles. Ovisacs present.

Prostates occupying eight segments each, of which the duct is confined to the first two. Duct straight and half as thick as the gland; gland moderately thin, tubular, straight (not coiled as described by Beddard for a type specimen), sharply separated from the duct.

Penial setal sac muscles originate from the body-wall at, or at about (the state of preservation leaves this character in some uncertainty) the 16th intersegment behind their respective prostatic pores, i.e. at about intersegment 33/34. Penial setae: Beddard originally described the penial setae as of two sorts, one fully twice as long as the other, but otherwise alike and unornamented. Michaelsen later re-described the penial setae but did not mention the question of dimorphism; he described them as ornamented, but was unable to observe this in some specimens (from Punta Arenas, South Patagonia). In the present specimen the setae of the two sub-bundles are dissimilar; those of the *a* bundle are three times as long as those of the *b* bundle and are apparently smooth, while those of the *b* bundle are ornamented. Penial setae of the *a* bundle are strongly curved when removed, but apparently lie straight in the setal sac; approximately the distal half is somewhat flattened and broadened so as to appear strap-like when turned about, the extreme distal end (Fig. 2 *h*) forming a thin, bluntly pointed, scoop-like blade. Dimensions of *a* setae: length approximately 10 mm., diameter near base about 26μ, in proximal half of stem 14–$15{\cdot}5\mu$, distal half 8–11μ thick and 15–18μ broad, near the blade $12{\cdot}5$–14μ broad, thickness of blade about $1{\cdot}5\mu$. Penial setae of the *b* bundle with a straight stem curved only at the distal end, tapering gradually and terminating in a flattened but not broadened blade which ends bluntly (Fig. 2 *g*), the distal half of the stem ornamented with rows of fine close-set teeth. Dimensions of *b* seta: length 3·6 mm., diameter near base $33{\cdot}5\mu$, in middle of stem 20–$21{\cdot}5\mu$, near distal end 11μ, breadth of blade $7{\cdot}5\mu$. It seems probable that Beddard was correct in describing a dimorphism of penial setae for the types of this species, but that he failed to observe the ornamentation of the outer setae; Michaelsen on the other hand appears to have overlooked the lack of ornamentation of the *a* setae, but it is possible that in his specimens the *a* setae were also ornamented.

Spermathecae: the spiral diverticulum is to the outer side of the ampulla and duct, not to the inside as figured by Beddard; it is also considerably thicker (Fig. 3 *b*). On the left side the direction of the spiral is clockwise, on the right side anti-clockwise.

In other characters, both external and internal, this specimen is in essential agreement with previous descriptions.

Subfamily *DIPLOCARDIINAE*

Genus Dichogaster, Bedd.

Dichogaster bolaui (Mich.) var. (Fig. 2 *j–l*).

For complete synonymy and bibliography up to 1900, see:

Dichogaster bolaui, Michaelsen, 1900, *Das Tierreich*, x, *Oligochaeta*, p. 340.

Reference may also be made to:

Dichogaster bolaui, Stephenson, 1923, *The Fauna of British India: Oligochaeta*, p. 472 (London).

Annobon, found under stones near edge of lake, 13. viii. 27; three clitellate specimens, one of which is very damaged, and a fragment.

Length: the uninjured specimen is 69 mm., the other not badly damaged specimen is without the tip of the tail but measures 58 mm. Maximum diameter 2 mm. Colour: one specimen is slightly tinged with red-brown pigment dorsally on segments 2–8, also the clitellum is red-brown; the other two specimens are apparently unpigmented.

Clitellum saddle-shaped on segments 13–21 or $\frac{1}{2}$22. Copulatory papillae as median ventral papillae at various intersegments (specimen 1 at 15/16 and 20/21; specimen 2 at 9/10, 10/11, 15/16, 20/21, 21/22 and 22/23; specimen 3 at 10/11 and 15/16). Dorsal pores: in the best-preserved specimen the first dorsal pore is visible at 5/6. Gizzards in segments 6 and 7. Septa 4/5 and 5/6 present, 6/7 apparently absent. Last pair of lateral hearts in segment 12. Nephridia in four rows on each side, sometimes a little irregular. Seminal vesicles, two pairs in segments 11 and 12. Penial setal sac muscles arise from the first intersegment behind their respective prostatic pores. Spermathecae: the septa have slipped back so that the anterior spermathecae lie in front of septum 7/8, the posterior pair partly in front of 8/9 and partly projecting into segment 9. Ovisacs present.

Penial setae: in general the penial setae agree with the descriptions for this species, but the size is unusually large and the distal end of the smooth seta forms a much less conspicuous blade than usual. Setae of the *a* bundle are 0·52–0·59 mm. long, 9 μ in diameter in the mid-region of the stem, narrowing to 4·5–5·5 μ towards the distal end; the distal end ornamented with about 6 large teeth arranged in two rows, a seventh smaller tooth may be present proximal to the others, and several of the more basal teeth are double (Fig. 2 *j*). Setae of the *b* bundle are 0·46–0·5 mm. long, about 6 μ in diameter in the mid-region of the stem narrowing to 3 or 4 μ towards the distal end, the distal end is slightly flattened (4 μ thick and 5·5 μ broad), the tip is flattened considerably but not broadened (3 μ broad and *ca.* 1 μ thick), and terminates in a slightly notched edge (Fig. 2 *k*, *l*); these setae are unornamented.

In other characters these specimens are in essential agreement with the descriptions of *D. bolaui*.

Observations. In addition to the typical *D. bolaui* at least five different forms or varieties of this species have been recognized, viz. *palmicola* Eisen, *pacifica* Eisen, *octonephra* Rosa, *decanephra* Michaelsen and *malabarica* Stephenson. At least two other

species of *Dichogaster* appear to be closely related to *D. bolani*, viz. *D. malayana* (Horst)[1] and *D. rugosa* (Eisen); the former is primarily distinguished by the ring-shaped clitellum, and the latter by its pigmentation. The specimens under consideration differ from typical *D. bolaui* as follows:

(1) Greater size; in this character they approach *palmicola* of Eisen, but differ from specimens referred to this variety by Stephenson[2], which are quite small.

(2) Pigmentation of one specimen (the others may be either faded or really not pigmented). In this character there is an approach to *D. rugosa*. Michaelsen[3] makes the following statement concerning certain specimens of *D. bolaui* from New Caledonia "Die Stücke von der Station am Fluss bei Cone sind mit einer Farben-Angabe über die lebenden Tiere versehen: Vorder-Ende 'rosarot'". Stephenson[4] also describes var. *malabarica* as with a dark mid-dorsal stripe. It would therefore seem that a trace of pigmentation is of doubtful taxonomic significance in this species, and in the absence of other very definite distinguishing characters it is doubtful whether *D. rugosa* should be retained as a distinct species (the form of the distal end of the smooth penial setae (? *b*) is probably not sufficiently different to be treated as a specific character).

(3) Nephridia in four rows on each side. In this character the present specimens agree with *octonephra* and also with *D. rugosa*. In *decanephra* there are five rows while in the other forms under consideration there are only three.

(4) Two pairs of seminal vesicles in segments 11 and 12. The additional pair of seminal vesicles also characterizes *octonephra*, *palmicola* and *pacifica*.

(5) Gizzards in segments 6 and 7 instead of 7 and 8. Stephenson[5] records this peculiarity for specimens of otherwise typical *D. bolaui* from Burma. The absence of septum 6/7 is paralleled by the absence of septum 7/8 in *palmicola* and *pacifica*.

(6) The distal end of penial seta *b* (the smooth seta) is not broadened or spoon-shaped, but merely flattened and slightly notched. Michaelsen[6] has described a similar reduction of the distal end for *decanephra* from the island of Annobon. Although the present specimens differ from *decanephra* in their larger size and in the number of nephridial rows it is significant that the form of the penial setae should be similar, since they come from the same locality.

On the whole the present specimens agree most closely with *octonephra*, but from this variety they differ in the indications of pigmentation, in their larger size and in the form of the distal end of penial seta *b*. *D. bolaui* appears to be a very variable species and it is doubtful how far the different forms described are really taxonomically significant.

[1] Stephenson (*Rec. Ind. Mus.*, XXXIII, p. 195) considers *D. bolaui* and *D. malayana* to be identical.
[2] Stephenson, J., *Rec. Ind. Mus.*, XII, p. 348.
[3] Michaelsen, W., in: Sarasin, F., and Roux, J., *Nova Caledonia, Zoologie*, I, p. 273. Wiesbaden.
[4] Stephenson, J., *Mem. Ind. Mus.*, VII, p. 257.
[5] *Ibid.*, *Proc. Zool. Soc. London*, 1931, I, p. 65.
[6] Michaelsen, W., *Ergeb. d. Zweiten Deutsch. Zentral-Afrika-Exped.* 1910–11, I, *Zoologie*, p. 191. Leipzig.

Family LUMBRICIDAE

Genus **Eiseniella**, Mich.

Eiseniella tetraedra, f. **typica** (Sav.).

Tristan da Cunha, under stones near settlements, 31. i. 26; two clitellate and one immature specimen.

Genus **Eisenia**, Malm. *em.* Mich.

Eisenia rosea (Sav.).

Tristan da Cunha, under stones near settlements, 31. i. 26; three mature or semi-mature specimens; two immature specimens probably referable to this species.

Genus **Allolobophora**, Eisen *em.* Rosa

Allolobophora caliginosa (Sav.).

Tristan da Cunha, under stones near settlements, 31. i. 26; two immature specimens probably referable to this species.

Genus **Dendrobaena**, Eisen *em.* Rosa

Dendrobaena subrubicunda (Eisen).

Falkland Islands, Teal Inlet, 5. iii. 27; four clitellate specimens, two with clitellar bands, and eight immature specimens.

Clitellum including segments 26, $\frac{1}{2}$26, or 27–31. Clitellar bands including segments 28 or $\frac{2}{3}$28–30, *ca.* $\frac{1}{3}$31 or 31. In most specimens the gizzard is either confined to segment 17 or extends very slightly into 18; in one specimen it extends as far as $\frac{1}{3}$18 and in another to as much as $\frac{2}{3}$18. This restriction of the gizzard to one segment has not been recorded before in this species. Its occurrence in these specimens serves further to show that the distinction, based on this character, which separates *Eiseniella* from the other Lumbricid genera is not by any means definite (see Stephenson[1] for a discussion of this subject).

In all but two specimens there are two pairs of spermathecae normally situated, in segments 9 and 10 at intersegments 9/10 and 10/11. In two immature specimens there is only one pair in segment 9 at intersegment 9/10. Since both pairs are visible as rudiments in other equally immature specimens it seems certain that these two specimens are abnormal in this character.

Genus **Bimastus**, Moore

Bimastus tenuis (Eisen).

Tristan da Cunha, under stones near settlements, 31. i. 26; one clitellate specimen, three immature specimens probably referable to this species. Falkland Islands, Teal Inlet, 5. iii. 27; one clitellate specimen.

The clitellate specimen from Tristan da Cunha appears to be quite normal except that the clitellar bands occupy three segments (28–30) instead of the more usual number 2 (29–30). The specimen from the Falkland Islands is peculiar in that it is quite un-

[1] Stephenson, J., *The Oligochaeta*, Oxford, 1931, p. 908.

pigmented; it is improbable that this is due to fading, since specimens of *Dendrobaena subrubicunda* in the same collection are normally pigmented. In this specimen the clitellar bands occupy ½28–30. As in the specimens of *D. subrubicunda* from this locality, the gizzard is restricted to segment 17. In the specimen from Tristan da Cunha this is not so; it is interesting that the same peculiarity should appear in two different species from the Falkland Islands.

Genus **Lumbricus**, L.

Lumbricus rubellus, Hoffm., f. **tristani**, nov.

Tristan da Cunha, under stones near settlements, 31. i. 26; four clitellate, one semi-mature and four immature specimens, the last probably referable to this species (*Type* and *paratypes*).

In the five specimens in which clitellar bands are developed they include segments 27–31, instead of the normal 28–31. This peculiarity has not apparently been recorded for this species previously, and its occurrence suggests that the specimens from Tristan da Cunha are to be regarded as a distinct race. In the absence of definite evidence that such a variation does not occur occasionally in this species in Europe or elsewhere, it seems undesirable to create a separate subspecies for the specimens from Tristan da Cunha.

Lumbricidae Incertae Sedis

Tristan da Cunha, under stones near settlements, 31. i. 26; one abnormal clitellate specimen, two very juvenile specimens and several fragments.

Abnormal specimen. Length 73 mm. Diameter at anterior end 2 mm., in region of clitellum 3 mm., posteriorly 1·5 mm. Number of segments approximately 124; an accurate count is impossible on account of the poor state of preservation and the subdivision of segments in the clitellar region. Colour, pigmented dark purple-brown dorsally especially at the anterior end, decreasing in intensity and extent posteriorly, slightly pigmented ventrally on about the anterior 12 segments, clitellum pallid whitish brown.

Prostomium prolobic. Clitellum on right side including segments 39–47, on left side segments 39–48; owing to irregularities of segmentation segment 39 on the left side corresponds to 39 and 40 on the right side, while segment 41 on the right side corresponds to segments 40 and 41 on the left side. Clitellar bands on right side 39–½42, on left side 40–46. Copulatory papillae on left side on segments 19 and 25. First dorsal pore 6/7 (?). Spermathecal pores not visible externally; from internal examination the spermathecae open between setal line *d* and the mid-dorsal line (*v. infra*). Female pores not visible externally. Male pores on swollen papillae external to seta *b*, on the right side on segment 19, on the left side on segment 24. Intersetal distances: the setae are widely paired, *aa* : *ab* : *bc* : *cd* : *dd* = approximately 3 : 1 : 2 : 1 : 5 at the anterior end.

Internal anatomy. Owing to the poor state of preservation it is impossible to give a detailed account of the internal structure.

Gizzard confined to segment 29.

Reproductive organs: right side: two spermathecae at intersegments 14/15 and 15/16; two testes and spermiducal funnels, free, in segments 15 and 16; five seminal vesicles,

in 14 from septum 14/15, in 15 from 15/16, in 16 from 15/16, in 17 from 16/17 and in 18 from 17/18; the last empty sacs without contents; an ovary and oviduct in segment 18. Left side: three spermathecae at intersegments 15/16, 17/18 and 18/19; testes and spermiducal funnels, free, in 16, 18 and 19; seminal vesicles apparently absent; ovary and oviduct apparently absent.

It is impossible to refer this specimen to any familiar species. If the right side alone is considered and the anterior testes and funnels assumed arbitrarily to be in their normal position in segment 10 the gizzard would lie in segment 24 and the clitellum on about segments 34–42. If the gizzard is assumed to be in a normal position in segment 17 the clitellum would be situated on about segments 27–35. Neither of these positions, when taken in conjunction with other characters, fit any known species, and in any case the interval between the anterior testes and the gizzard is exactly twice the normal interval (fourteen segments instead of seven). On account of the dorsal position of the spermathecae and the restriction of the gizzard to one segment, this specimen might at first sight be referred to the genus *Eiseniella*, especially as *E. tetraedra* occurs in the same collection. Unfortunately the position of the male pores lateral to setal line *b* precludes this identification. In specimens of *Dendrobaena subrubicunda* from the Falkland Islands, described in the present communication (p. 288), the gizzard was found to be confined frequently to one segment; unfortunately the dorsal position of the spermathecae make it improbable that the abnormal specimen under consideration is referable to this species; moreover *D. subrubicunda* has not as yet been recorded from Tristan da Cunha. The dorsal position of the spermathecae suggests that it belongs to the genus *Eisenia* (since it is not either *Eiseniella* or, on account of the free testes, *Octolasium*). Michaelsen[1] observes that in some species of *Eisenia* the gizzard occupies only a part of segment 18 in addition to segment 17. In *E. veneta*, the only commonly peregrine species of this genus in which the setae are not closely paired, the clitellar bands are in the form of two pairs of tubercles and not a continuous wall as in the present specimen. In any case, on account of the intense pigmentation, this specimen cannot be referred to *E. rosea*, the only *Eisenia* recorded from the island, and it is equally certain that it cannot be identified with any of the other lumbricid species so far known to occur on Tristan da Cunha (*Lumbricus rubellus*, *Allolobophora caliginosa* and *Bimastus constrictus*).

The cause of the extreme abnormality of this specimen is quite obscure. Hyper-regeneration of segments has not been recorded in the Lumbricidae which, on the contrary, usually regenerate fewer than the normal number of segments when the anterior end is removed. This phenomenon is, however, known in the allied form *Criodrilus*. There are no obvious signs of injury in the present specimen and, in the absence of further evidence, the abnormality would seem to be more probably of a developmental nature. It may be compared with the abnormal specimen of *Microscolex georgianus* described previously (p. 277), in which the prostatic pores are situated very far back and abnormally reduplicated.

[1] Michaelsen, W., *Ann. Mus. Zool. Acad. Imp. Sci. St Pétersbourg*, XV, 1910, p. 9.

[*Discovery Reports. Vol. IV, pp.* 291–460, *Plates VI–XVII, August,* 1932]

FORAMINIFERA

PART I. THE ICE-FREE AREA OF THE FALKLAND ISLANDS AND ADJACENT SEAS

By

EDWARD HERON-ALLEN, F.R.S.

AND

ARTHUR EARLAND, F.R.M.S.

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(Plates VI–XVII, text-fig. 1)

INTRODUCTORY NOTE

The bottom deposits received from the R.R.S. 'Discovery' and the R.R.S. 'William Scoresby' cover a very wide area. Apart from gatherings made *en route*, which are too widely scattered to yield much information except as regards new species contained therein, some of which have been already described by us in the *Journal of the Royal Microscopical Society*,[1] they include detailed surveys of the sea bottom in

(1) the seas surrounding the Falkland Islands,
(2) the South Georgia area,
(3) the South Sandwich, the South Orkneys, the South Shetlands and off the coast of the Antarctic Continent.

The Falkland Islands, being entirely outside the region of ice, form a definite area and constitute the subject of the present report.

THE FALKLAND AREA AND ITS FORAMINIFERA

The Falkland Islands—"Les Îles Malouines" of d'Orbigny and the French geographers—are an extensive group consisting of two large and many small islands situated between the 51–53 parallels of S latitude and the 57–61 meridians of W longitude. They stand on the Continental Shelf which here extends for many hundreds of miles from the South American coastline, sweeping out in a broad tongue to include the islands. To the west and north of the group comparatively shallow water extends over an enormous area, but on the south and east of the islands deeper water approaches their shores and separates them from the great Burdwood Bank lying to the south of the islands. This is an outlier of the Continental Shelf and is separated from the mainland and from the Falkland Islands by over 100 miles of deep water. The 500-fathom line envelops both the bank and the islands.

The Falkland Islands are in the sub-Antarctic region, lying between the surface isotherms of 6° and 12° C., and are therefore well outside the northernmost extension of pack-ice. Most of the water passing Cape Horn and flowing up to the Falklands is of

[1] On the Pegididae, a new Family of Foraminifera, Vol. XLVIII, 1928, pp. 283–99, pls. i–iii, fig. 1. Some new Foraminifera from the South Atlantic, No. 1, Vol. XLIX, 1929, pp. 102–8, pls. i–iii: No. 2, Vol. XLIX, 1929, pp. 324–34, pls. i–iv: No. 3, Vol. L, 1930, pp. 38–45, pl. i.

6–8° C. temperature. It is of Pacific origin, and some of it probably comes down the western coast of South America and, being swept through the Drake Straits with the Pacific water of the West Wind Drift, would naturally turn up by the Falklands as soon as it passes Cape Horn, which, projecting southwards, to some extent dams back the flow of water. The West Wind Drift proper passes well to the south of the Falklands, through the deep channel separating the Falklands from South Georgia, and so into the Atlantic Ocean. The Pacific water, diverted northwards, forms the Falkland Islands Current, encircling the islands.

Evidence of the general low temperature of the water for the latitude is afforded by:

(1) the types of Foraminifera dominant in the bottom deposits,

(2) the absence or paucity of other types usual in such latitude.

As an example of (1) we may quote *Cassidulina crassa*, which is universally distributed in our material and frequently forms a major portion of the organic remains. Although of almost world-wide distribution, this species is definitely a "cold area" form, and is found in similar abundance in the cold areas of other oceans.

As an example of (2) we may quote the genus *Spiroloculina*, which is unrepresented in our Falkland material, although one of the commonest shallow-water forms in warm and temperate seas all over the world. In the northern hemisphere, under the influence of the warm Atlantic current (Gulf Stream), the genus is abundantly represented by several species at least as far north as the Shetland Islands, which are in about the same latitude as the Orkney Group in the southern hemisphere.

The area covered by the stations is very extensive, as they spread over the sea bottom roughly between 48–54° S and 57–68° W, which is more than the entire area of the North Sea from Texel to the Shetlands, and from the shores of Great Britain to the Continent. Nevertheless, owing to the enormous extension of the Continental Shelf and the uniformly low bottom temperature, there is no great variety in the samples, except as regards the fauna of the stations on the Shelf, and the fauna of the few deeper water stations outside the Continental Shelf, which are under more normal benthic conditions.

From the samples it would appear that the thousands of square miles of sea bottom on the Continental Shelf consist of comparatively barren wastes of gravel and sand, usually brown in colour. The larger grains are generally rounded, sometimes highly polished, notably so at stations WS 92, 95, 219, 221, indicating either that they have travelled a great distance, or that they are kept in constant motion by currents and wave action.

There is, as a rule, little mud[1] present in any of the deposits from the area to the south and the west of the islands, within a line from Eddystone Light to Cape Tres Puntas. Its absence may perhaps be due to the action of the current which passes to the west of the islands, for the percentage of mud increases to the north of the islands and in their lee, as it were, and the sand grains are smaller and more angular. Broken shells, often covered with sessile Foraminifera, form an important percentage of the total bulk at some stations, indicating a variety and abundance of organic life which is elsewhere absent.

[1] Samples taken in the conical dredge, which has a canvas bag, probably lose a small proportion of the mud present.

The number of Foraminifera present in these "Shelf" stations varies enormously, and as the bottom conditions are otherwise very similar, we are inclined to the view that they are influenced very largely by the Falkland Islands current, which no doubt brings with it large food supplies in the shape of diatoms and other micro-plankton. At stations WS 86 and 87 on the Burdwood Bank, and at station WS 88 which is in line with them to the westward, just within the curving southern extremity of the Continent, Foraminifera are abundant and form a large proportion of the bottom deposit. There is a similarly abundant fauna at stations WS 83, 84, 91, 92, farther north, where the current divides to encircle the islands. But as we get farther away from the entrance point of the current, and especially as we approach the Continental shore, the sand becomes increasingly barren of Foraminifera (stations WS 77, 78, 79, 80, 90, 94, 95, 108) until, at station WS 96, which is near Port Desire, they are practically absent. They reappear in some abundance in the stations to the north of the islands on the edge of the deeper water, near the mud line.

There is a monotonous sameness in the foraminiferal fauna over the whole of the Shelf area, and on a casual inspection it appears to be almost identical at the majority of stations and to consist of a few species only:

Cassidulina crassa	*Truncatulina lobatula*
Cassidulina subglobosa	*Truncatulina refulgens*
Cassidulina parkeriana	*Truncatulina akneriana*
Ehrenbergina pupa	*Truncatulina ungeriana*
Uvigerina angulosa	*Anomalina vermiculata*
Globigerina—several species	*Pulvinulina karsteni*
Pullenia subcarinata	

These few species as a rule, in one combination or another, form the bulk of the material with either *Cassidulina crassa* or *Uvigerina angulosa*, or the two together, assuming a dominant position, even among what appears to be a very limited fauna. At some of the stations, *Cassidulina crassa* was estimated to form 90–95 per cent of the cleaned material, at others *Uvigerina angulosa* probably formed an equally high proportion. The occurrence of a species in such overwhelming numbers might be expected to produce many abnormalities, and it is therefore worthy of mention that abnormal specimens are extremely rare.

It is only after the examination of a quantity of material that it becomes apparent that a really varied list of species is present at some of these stations, masked by the dominant forms. Station WS 83 may be quoted as an instance. The material was to all superficial appearances very unpromising, as *Cassidulinae* formed at least 90 per cent of the mass. But the remaining 10 per cent. proved to be extraordinarily rich and yielded some 200 species. The list could doubtless have been extended if time and more material had been available.

In a few instances, a species which usually occupies a subordinate position becomes almost dominant. As an example we may take *Spiroplectammina biformis*, a species of very wide distribution in many seas, though never common. It occurs at eleven stations,

often in considerable numbers, but always as an inconspicuous item in the fauna. But at station WS 76, where the fauna, though varied, was not rich, it appears as a dominant form. It does not occur at all at the nearest adjacent stations 51 and WS 73 which are in shallower water, and presumably the somewhat greater depth favoured its unusual development. But at present we know very little of the causes favouring the abnormal increase of a species in one locality as compared with another to all appearances identical.

Apart from the interest raised by the enormous development of these dominant forms, the Falkland fauna is itself full of interest. It includes many species of world-wide distribution as a matter of course, and many other species known from similar cold temperate waters in the northern hemisphere. As the Falkland Islands lie in approximately the same latitude as southern England it is not surprising that many typical British species figure in our lists. But it is rather a matter for wonder that some of the rarer British species (e.g. *Lagena millettii*, *Lingulina quadrata*, *L. translucida*) and others which we have known from British waters for many years but had not yet had an opportunity of describing (e.g. *Lingulina falcata*, *Patellinoides conica*, *P. depressa*) should also be found in such a distant locality. Considering their extreme rarity in each of these widely separated areas, it remains an insoluble problem how these species achieved their distribution across the deep water of the Atlantic, for their migration by the shore line would almost certainly be prevented by differences of temperature.

Yet in spite of general resemblances to the British fauna, there are certain species found in both areas which present differences in the Falklands suggesting a distinct local race, the variations seldom being sufficient in our opinion to justify varietal, much less specific distinction. *Lagena williamsoni* (Alcock) is one of the commonest British *Lagenae*. The type is a pyriform costate shell with 12–18 costae and hexagonal ornament on a collar round the neck. The Falkland form described under the name *L. vilardeboana* (d'Orbigny) is almost equally common in our area where we recorded it from eighteen stations. The costae are much more numerous but are weakly developed, and the hexagonal ornament is reduced to a series of pin-pricks on the collar. *Discorbis nitida* (Williamson), again, is a typical and fairly common British species. The Falkland Islands specimens are more concave on the ventral side, with an increased convexity of the dorsal side, generally more robust and less "*nitida*" than the type.

But in neither case should we have any hesitation in assigning the two races to the same species, and the differences are no doubt due to long isolation under somewhat varied conditions. Many similar cases could be quoted.

The Falklands possess several species which are either wholly or almost wholly peculiar to the area. Notable among these is *Ehrenbergina* (*Cassidulina*) *pupa*, first described by d'Orbigny in 1839 from these islands. He states that it is much rarer than *Cassidulina crassa*, but we record it from twenty-eight stations, and at some of them it is almost as common as that species. Outside the Falkland Islands it may be said to be almost unknown. The only records which can be accepted, even with suspicion, are from the west coast of Patagonia and from Rio de la Plata. Nor is it replaced in abundance

elsewhere by any other species of the genus. Its dominance in the Falklands is one more of those mysterious problems of distribution which need solution.

Elphidium (*Polystomella*) *lessonii* (d'Orbigny), which is a handsome species often common in the Falkland material, appears to be almost (if not wholly) confined to the area.

The species *Heronallenia* (*Discorbis*) *kempii*, which is one of the largest and certainly the handsomest species in the genus, appears to be confined to the Falklands, where it is found only in the southern area between the Burdwood Bank and a line running from the Magellan Straits round the southern shores of the islands. Its nearest relatives are almost wholly of Pacific habitat, and it appears unquestionable that this species is an immigrant of comparatively recent Pacific origin which has not yet had time to spread over the more distant parts of the Falkland area.

There are several other species which can be assumed to have migrated from the Pacific to the Falkland area, but in most cases there can be no definite proof owing to the paucity of records. We list several species which d'Orbigny recorded from the west coast of South America but not from the Falklands. But it would be very dangerous to regard these as immigrants on such evidence alone, in view of the notorious tendency of d'Orbigny to overlook, or disregard, species with which it is certain that he was familiar. The mere fact that he did not identify and name the dominant *Uvigerina angulosa*, one of the two commonest and most widely distributed of the Falkland species, is sufficient to prevent his records from being taken too seriously as evidence of extension of locality.

The species in regard to which there is the best and most definite evidence of extension of habitat is *Rotalia clathrata*, Brady. This is a common and typical species in Australian waters and is also found in the Miocene of Victoria. Between that area and the west coast of Patagonia, where it was found among the islands by the Challenger Expedition, there are no records of its occurrence. Now we record it from the Falklands at thirteen stations, nearly all of which are south of a line running from Magellan Straits round the southern shore of the islands. The finest examples, which are quite equal to the New Zealand types, came from the three stations WS 86, 87, 88, which lie stretched across the southern entrance to the Falkland area, between the extremity of the Continent and the Burdwood Bank, while at WS 89, 90, further north and nearer the Magellan Straits, the specimens are small and starved. The west of Patagonia specimens are stated by Brady to be smaller and weaker than the New Zealand type. It seems certain in this case that the species has reached the Falklands *via* the Horn and not by way of the Magellan Straits and that it is diminishing in size as it passes northwards into less favourable surroundings. If it had travelled *via* the Straits, its distribution would presumably have extended to the north of them as well as to the south.

There is of course an alternative possibility that the New Zealand, Patagonian and Falkland colonies are separate survivals from a Miocene sea in which the species occurred universally between these areas. But we have no geological information bearing on such a speculation beyond the fact that numerous fossil Foraminifera were found in the bottom deposits at several stations, particularly at station WS 87 on the Burdwood Bank, where they were found in such numbers as to suggest a submarine outcrop of some fossiliferous

strata in that locality. We have not attempted their identification, in fact it would be difficult to do so as many of the specimens are casts, and others so distorted by pressure and slipping as to be almost unrecognizable. In these features they bear a striking resemblance to the Foraminifera from some of the Naparima beds of Trinidad. The presence of *Rzehakina epigona* (Rzehak) among the Burdwood Bank specimens almost certainly indicates that these fossils are of Upper Cretaceous age, or Lowest Eocene at the latest. The specimens (with others) have been submitted to Dr W. A. Macfadyen who will report upon their geological significance in a later Part.

PREVIOUS WORK IN THE AREA

The Falkland Islands have a particular interest for students of the Foraminifera, inasmuch as they supplied material for one of the earliest regional surveys in the literature of the Order. D'Orbigny in his celebrated voyage to South America (1826–34) collected material in the Falkland Islands, and at many localities round the South American coast from St Blas on the Patagonian coast (*c.* 40° 60′ S) to Payta on the Peruvian coast (*c.* 4° 07′ S). We do not know much about the nature or extent of the material examined. D'Orbigny himself collected shore sands; he also obtained local gatherings from merchant captains, which may have been either shore sands or anchor muds. We know, from indications in his *Tableau Méthodique des Cephalopodes* (1826), that he derived many of his species from ballast sand (*sable de délestage*) obtained from ships, and we can only express the pious hope that such sands were not included in his South American material. Very few details as to depth are given. He records with pride the taking of a sounding "fait à de (*sic*) grandes profondeurs" in sight of land off Cape Horn. This sounding was taken at a depth of 160 m. only, with a deep-sea lead, and it is stated that forty specimens of Foraminifera belonging to five species were removed from the tallow of the arming. Elsewhere he records making a gathering in 12–20 m. depth, and with the exception of the Cape Horn sounding, which was evidently regarded as a great feat, this probably represents the limit of depth of his material, a factor of some importance in connection with any survey of his work.

After his return to France, d'Orbigny published his discoveries, including the celebrated monograph on the Foraminifera of South America (1839), a work of outstanding importance and deserving of study apart from its taxonomical value. Eighty-one species are described and mostly figured in this work, seventy-eight of which he regarded as new to science. Thirty-eight of the species were from the Falkland Islands, and fourteen from the adjacent coasts of Patagonia and Cape Horn, the remainder being from the Pacific coast. He naïvely remarks that his total of eighty-one species "sera sans doute augmenté lorsqu'on voudra soigneusement rechercher sur tout le littoral des deux océans," and after nearly a hundred years we are in the position to confirm his forecast by presenting a list of some 435 species from the Falkland area alone.

At great length d'Orbigny gives his views that the east and west coasts of South America constitute distinct faunal areas, and that with the exception of a few species, which, being of world-wide distribution, did not count, all the Foraminifera on the

Atlantic side are specifically distinct from those found on the Pacific coast. The celebrated sounding off Cape Horn forms an important link in the chain of his argument. Among the five species recovered from the tallow, he found four peculiar to the Falklands, and only one species, *Bulimina elegantissima*, proper to the Pacific. So he records his belief that "Le Cap Horn, recevant les eaux qui se divisent en suite pour aller dans chaque mer, devait être le point de départ des deux faunes dont nous venons de parler, et montrer des espèces appartenant aux deux séries".

D'Orbigny's theory has stood the test of time better than most of the evidence on which it was based. Many of the crucial species, which he regarded as peculiar to one or the other area, have since been proved to have a much wider distribution. But the fact remains, and is even more fully confirmed by our own investigations, that the Falkland area is faunistically distinct from the Pacific coast, and that, although it possesses species of Pacific ancestry, these appear to have been derived from more distant parts of the Pacific than the immediately adjacent coast of South America—"round the corner", so to speak.

Many of d'Orbigny's species have no great specific value. They are, at best, the local forms of other well-known and older species. But we have, in this report, for the most part accepted them for reasons of history and sentiment, while pointing out their affinities to better known forms.

An attempt was made to verify the determination of our specimens of the d'Orbigny species recorded in this report, by comparing them with his original Type specimens. With this object in view, one of us (E. H.-A.) spent a considerable time in Paris, where, by the courtesy of Prof. Marcellin Boule, he examined and compared such Types as are available in the Laboratoire de Paléontologie attached to the Musée d'Histoire Naturelle. Unfortunately, during the century which has elapsed since d'Orbigny deposited his Types in the Museum, vicissitudes which have considerably obscured the enquiry have occurred, not the least of which was the flooding of the whole of the lower floors of the Museum in the great rising of the Seine in the year 1910.

It is impossible, after this lapse of time, to say in what condition and in what form d'Orbigny left his specimens, and those preserved in the Musée Fleuriau de Bellevue at La Rochelle, which Heron-Allen also examined, do not throw light on the subject, so far as the Amerique Méridionale specimens are concerned. D'Orbigny, so far as we know, from observations at La Rochelle, mounted his specimens on oblong slips of brown paper, or enclosed them, when numerous, in small glass-topped boxes.[1]

The Paris "Types" consist of selected specimens attached with copious gum-arabic (which is very hygroscopic) to slips of glass measuring $5\frac{1}{2} \times 1$ cm. Under this glass slip a piece of blue paper is inserted, which throws up the specimen, and the whole is enclosed in a small glass tube, which in turn is fastened with a heavy smear of cement to a board 8 cm. long, but of varying breadth, which board bears in manuscript the name and sometimes the locality of the enclosed specimens. This mounting and arrangement was,

[1] Heron-Allen, E. Alcide d'Orbigny, his Life and Work. *Journ. Roy. Micro. Soc.*, Presidential Address, 1917, pp. 1–105, pls. i–xiii, and pp. 433, 434.

we are informed, carried out about forty years ago by a retired naval officer, attached to the Musée d'Histoire Naturelle, and it is evident that he had some knowledge, however slight, of Foraminifera. The writing on the boards, however, is in different hands, indicating that various curators or workers, at various times, have overhauled the collections. It is known also that both Terquem and Schlumberger had unrestrained access to the collections and material deposited in the Museum by d'Orbigny.

The cement used to fasten the tubes is perishable—often indeed perished—and is very friable, with the result that scores of the tubes are at present lying separated from scores of boards to which they may, or may not, have been originally fastened. There is some evidence that unknown individuals have attempted, and not always with success, to match tubes against boards, guided apparently only by a comparison of the specimens with the plates to be found in d'Orbigny's various monographs. Moreover, in many cases, even where the specimens are the original Types, they have perished by degeneration of the glass, decomposition of the calcareous shell by fungoid outgrowths, or by the alternate expansion and contraction of the hygroscopic gum above referred to. Such Types as these are absolutely useless for purposes of comparison, and reliance will have to rest upon identification with d'Orbigny's figures.

By courtesy of Prof. Marcellin Boule, we have been privileged to examine, jointly, a considerable selection of such Types as are still recognizable as Foraminifera, at greater leisure in the Natural History Museum in London, and the results of this closer examination will appear in the notes appended to the individual species. We were also entrusted with eleven small bottles containing what is left of d'Orbigny's material, in which it has been satisfactory to find a considerable number of Topo-types, but we were warned that they had been already a good deal overhauled by Terquem and Schlumberger, and our examination of these arouses the suspicion that the contents of some of the bottles have become mixed, and contaminated with that of others.

Out of the eighty-one Types recorded in d'Orbigny's monograph, thirty-one are missing (as such). Of the fifty remaining Types, many are entirely destroyed by the agencies already mentioned.

Since d'Orbigny, very little work has been published on the Foraminifera of the Falkland Area. H.M.S. 'Challenger', on the homeward voyage, ran a line of stations Nos. 313–17 from Magellan Straits through the islands which may be briefly summarized:

St. 313. Jan. 20, 1876. 52° 20′ S, 67° 39′ W. 55 fms. Coarse sand.

This is very close to the position of our station WS 90. Brady (1884, FC, p. 106) writes: "Very muddy sand nearly barren of Foraminifera, contains only a few *Miliolinae*, *Truncatulinae*, *Discorbinae* and other shallow-water forms in starved condition". In the "Summary", p. 1172, there is a list of thirteen species of Foraminifera found at this station. They are all on our list for WS 90 except *Biloculina ringens* which was probably *B. globulus* as recorded by us.

St. 314. Jan. 21, 1876. 51° 35′ S, 65° 39′ W. 70 fms. Coarse sand.

Not far from our station WS 92. No records of the Foraminifera appear either in the "Summary" or in Brady.

St. 314 A. Jan. 22, 1876. 51° 24′ S, 61° 46′ W. 110 fms. Hard ground.

No material.

St. 315, 315 A, 316. Stanley Harbour. 6 fms. Blue mud.

Brady (1884, FC, p. 106) records "starved varieties of *Rotalia*, *Polystomella*, *Lagena* and *Bulimina*. The only species of any particular interest were *Patellina corrugata* and *Bulimina elegantissima*". In the "Summary", p. 1180, there is a list of twenty species, all of which figure in our report.

St. 317. Feb. 8, 1876. 48° 37′ S, 55° 17′ W. 1035 fms. Sandy gravel.

This is in the deep water outside our area. Brady (1884, FC, p. 106) records that the "Foraminifera were mostly North Atlantic or sub-Arctic cold-water types, but with very few arenaceous species".

The German expedition in the 'Gazelle' had a station 148 in 47° 01′ 30″ S, 63° 30′ W, 115 m. Egger in his report on the Foraminifera (E. 1893, FC, p. 22) gives brief details of the occurrence of *Cassidulina subglobosa*, *C. parkeriana*, *Uvigerina pygmaea* and *Pulvinulina elegans* on a bottom of grey-green sand with shells. This is on the Continental Shelf to the north of our area.

The Scottish National Antarctic Expedition of 1903–4 made two stations in the Falkland area. Pearcey gives brief details in his report on the Foraminifera (Pearcey, 1914, SNA, pp. 1031, 1034).

St. 118. Stanley Harbour. 2¼ fms. Brown mud with greenish tint.

Chief Foraminifera: *Bulimina elegantissima*, *Pulvinulina* (*Rotalia*) *karsteni* and *Polystomella striato-punctata*. *Proteonina difflugiformis*, *Trochammina nitida* and *T. nana* represent the arenaceous forms.

St. 346. 54° 25′ S, 57° 32′ W. On the Burdwood Bank. 56 fms.

(This is near WS 82, a station from which we had no material.) Calcareous, shelly and foraminiferous sand. No fewer than eighty species of twenty-five genera of Foraminifera were obtained. With few exceptions, all of the typical Antarctic, shallow-water character, but arenaceous types are conspicuous by their absence, being represented by *Trochammina nitida* only.

A number of species including three new species are listed. *Heronallenia* (*Discorbis*) *kempii* was found at this station (see No. 354 *post*).

Since this Report went to press we have received a short paper by Dr J. A. Cushman and Frances L. Parker entitled "Recent Foraminifera from the Atlantic Coast of South America" (*Proc. U.S. Nat. Mus.* No. 2903, 1931, pp. 1–24, pls. i–iv). It deals with material collected in shallow water (maximum 15 fathoms) in two very different areas, three of the stations being sub-tropical, in Rio de Janeiro Harbour, the other eight stations being sub-Antarctic, six of them lying among the Falkland Islands, and the other two off the Argentine Coast, in the neighbourhood of our stations WS 95, and WS 221.

The thirty-two species and varieties recorded by the authors from their sub-Antarctic area are mostly cosmopolitan, and very few of the characteristic Falklands species figure in their list. Twenty-six of them are dealt with in our Report under the same names (Nos. 29, 46, 61, 90, 100, 102, 105, 110 A, 135, 160, 163, 170, 182, 187, 191, 200, 252, 326, 340, 358, 390, 395, 417, 418, 420, 422). Three others we regard as synonymous with species recorded by us.

Quinqueloculina isabellei, d'Orbigny, *sub M. seminulum* (Linné), (No. 12).
Lagena iota, Cushman, *sub L. annectens*, B. and H. (No. 215).
Bolivina plicatella, Cushman = *B. pseudo-plicata*, H.-A. and E. (No. 151).

(An interesting question of priority arises between the two species of *Bolivina*, both having been published in 1930. Up to the time of going to press, we have not been able to ascertain the date of publication of *B. plicatella*.)

Three species remain which do not figure in our Report:

Virgulina, ? sp.
Elphidium australis, sp.n.
Elphidium alvarezianum, var. nov. *serratulum*.

The authors record two other species without distinction of locality. Both of them occur in the Falklands area and figure in our Report:

Bulimina patagonica, d'Orbigny (No. 130).
Elphidium incertum (Williamson) (No. 415).

A characteristic Falklands species, *Lagena caudata* (d'Orbigny) (No. 184) is recorded from the Brazilian area only, but the figure does not agree with d'Orbigny's Type.

MATERIAL EXAMINED

The material examined by us consisted of bottom samples from Sounding Machine or Dredge and Trawl "Residues". The material was, with few exceptions, received in spirit, and in an admirable state of preservation. The supply was usually sufficient (except in the case of soundings) for an exhaustive study of each station, but in a few instances was hardly enough to elucidate new species. In addition we received many selected specimens of large species, notably *Protobotellina*, which by their size had attracted the attention of the zoologists on board the ships.

A list of the stations worked over is as follows:

STATIONS MADE BY THE R.R.S. 'DISCOVERY'

48. TS 494.[1] C III.[2]

3. v. 26. 8·3 miles N 53° E of William Point Beacon, Falkland Islands. Trawl, 105–115 m.

A few cc. of clean shell sand yielded a long list of species, including *Tubinella* (*Articulina*) *funalis*, *Lagena danica* and *Rotalia clathrata*.

51. TS 495. C III.

4. v. 26. Off Eddystone Rock, Falkland Islands, East. Nets on trawl, 105–115 m.

A few fragments of Hydroids were covered with sessile specimens of *Discorbis globularis* and *D. rosacea*, *Truncatulina lobatula* and *T. variabilis*. Some sand and organic débris (principally sponge) yielded a long list of the common Falkland species.

53. TS 519. C III.

12. v. 26. Port Stanley, East Falkland Islands. Mussel rake, 0–2 m.

A quantity of organic débris derived from washings of Hydroids and *Mytilus* clumps. Very little sand received, but it contained many Foraminifera. *Miliolina circularis*, *M. subrotunda*, *Tubinella funalis*, *Trochammina squamata* and *Cassidulina laevigata* were all very common. *Cassidulina crassa* was absent, and *Uvigerina angulosa* very rare. Over thirty species were obtained from the small quantity of material received.

[1] These numbers refer to the station slides in the Heron-Allen and Earland collection in the Natural History Museum.
[2] These numbers afford reference to the positions of the stations as shown in Fig. 1, p. 303.

228. TS 515. B IV.

2. v. 27. 53° 33′ 00″ S, 61° 49′ 30″ W. Baillie sounding rod, 660 m.

Ten cc. of tenacious dark grey mud, washed on 200 mesh silk, yielding about 1·5 cc. residue, largely Diatoms and Radiolaria. Quite a long list of species, many represented by single specimens. *Chilostomella oolina*, *Uvigerina angulosa*, and *Nonionella auris* figure among the rarer forms.

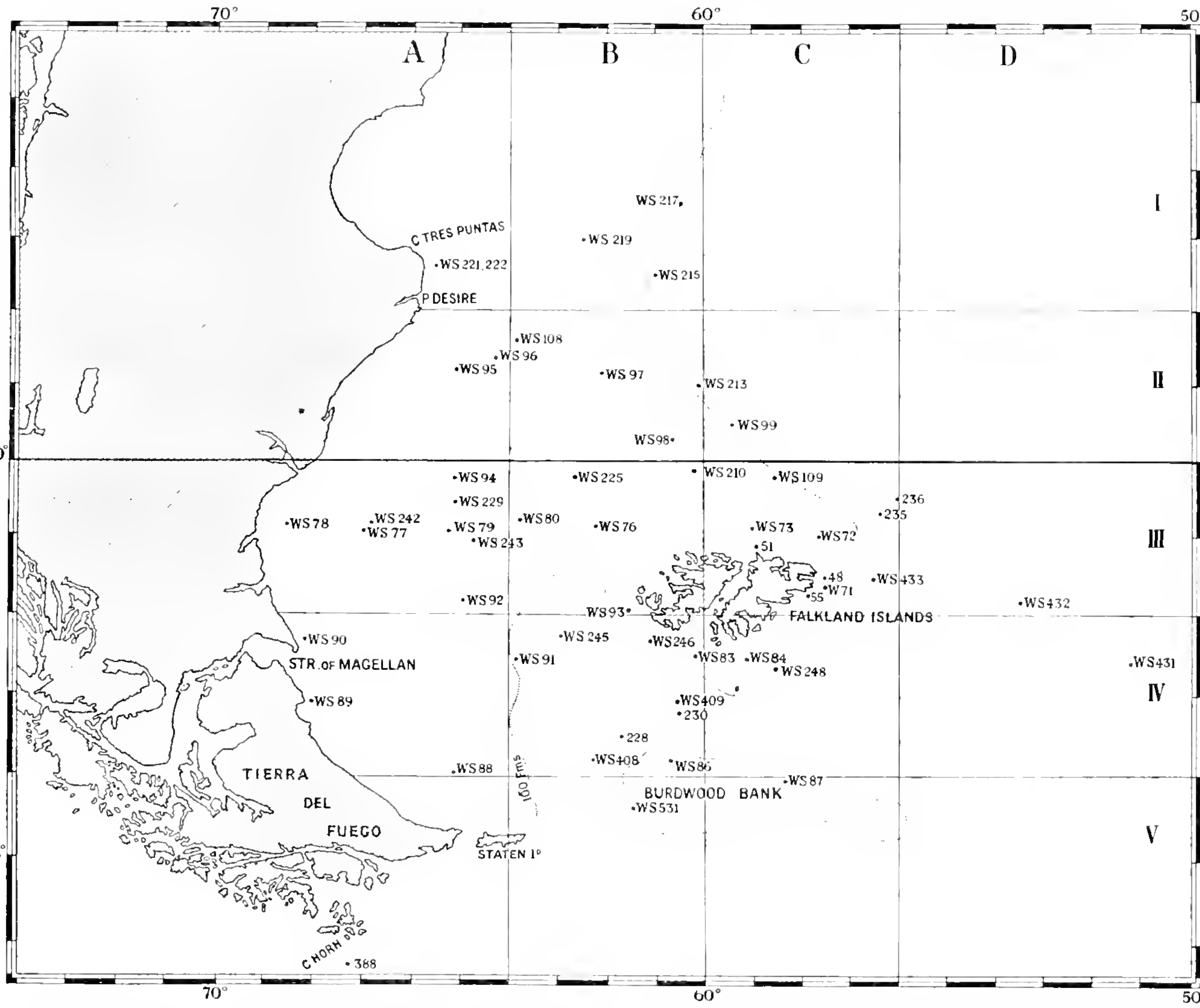

Fig. 1. Chart of the Falkland Islands and adjacent seas, showing positions where Foraminifera were obtained.

230. TS 511. B IV.

5. v. 27. 53° 17′ 00″ S, 60° 25′ 00″ W. Baillie sounding rod, 675 m.

Fifteen cc. of tenacious grey mud which was reduced to less than 0·5 cc. when washed on 200 mesh silk. The residue consisted of a few large sand grains, a few pyritic casts, and Foraminifera, mostly broken shells, *Globigerinae* and *Uvigerinae* being dominant. A good many species were recorded, many represented by a single specimen. Among the rarer forms were *Anomalina umbilicatula*, sp.n., and *Virgulina schreibersiana*, var. *spinosa*, var.n.

235. TS 498. C III.

29. v. 27. 50° 45′ 00″ S, 56° 18′ 30″ W. Baillie sounding rod, 600 m.

About 9 cc. of grey mud, reduced to 2 cc. by washing on 200 mesh silk sieve, yielded quite a number of interesting species, including *Lagena quadralata*, spinous specimens of *Nodosaria laevigata* and *N. rotundata*, and *Uvigerina angulosa* var. *pauperata*, var.n.

236. TS 499. C III.

29. v. 27. 50° 35′ 30″ S, 55° 59′ 15″ W. Baillie sounding rod, 612 m.

About 12 cc. of dark grey mud reduced to 3 cc. by washing on 200 mesh silk sieve. The residue consisted of *Globigerinae* with glauconite and sub-angular sand grains. Varied and abundant Foraminifera, including *Ehrenbergina hystrix* var. *glabra* and *Virgulina schreibersiana* var. *spinosa*, var.n.

388. TS 517 E (1, 2). A V.

16. iv. 30. 56° 19′ 30″ S, 67° 09′ 45″ W. Dredge, 121 m.

Polyzoan and Molluscan shell sand with large rounded pebbles and angular sand grains. *Gypsina inhaerens* encrusting the pebbles, but no other sessile species seen. Quite 33 per cent of the finer material was made up of one species, *Cassidulina crassa*. The finest material contained an abundant and varied fauna, including many of the new and rarer species found elsewhere in the Falkland area.

This station is probably very near the spot on which d'Orbigny made his famous deep sounding within sight of Cape Horn (see *ante* p. 298).

STATIONS MADE BY THE R.R.S. 'WILLIAM SCORESBY'

WS 71. TS 518. C III.

23. ii. 27. 6 miles N 60° E of Pembroke Light, East Falkland Islands. Trawl, 82–80 m.

About 12 cc. of coarse débris mixed with shell sand and rounded quartz grains. Foraminifera did not form a high percentage of the material, but were varied and in good preservation. *Cassidulina crassa*, *C. subglobosa*, *Truncatulina lobatula* and *T. akneriana* were the dominant forms. There was a long list of the commoner Falkland species with a few outstanding forms.

WS 72. TS 497. C III.

5. iii. 27. 51° 07′ 00″ S, 57° 34′ 00″ W. Snapper lead, 95 m.

A few grains of shell and mineral sand, and two worm tubes, yielded nine of the commoner species, mostly represented by single specimens.

WS 73. TS 496. C III.

6. iii. 27. 51° 01′ 00″ S, 58° 54′ 00″ W. Snapper lead, 121 m.

A small quantity of grey sand with many glauconite grains. *Uvigerina angulosa* was extremely common, other species (about twenty in all) mostly rare or very rare.

WS 76. TS 482. B III.

11. iii. 27. 51° 00′ 00″ S, 62° 02′ 30″ W. Dredge, 207 m.

Fine muddy sand, dark olive-green in colour, with very little coarser material. Foraminifera very few in numbers except *Cassidulina crassa* and *Uvigerina angulosa*. *Spiroplectammina biformis* was also common. Some interesting species were recorded, including *Bulimina ovula* and *Lagena hispida*.

WS 77. TS 478 A/B. A III.

12. iii. 27. 51° 01′ 00″ S, 66° 31′ 30″ W. Dredge, 110 m.

Dark brown sand with little mud. Foraminifera very scarce and generally pauperate.

WS 78. No TS (station slide). A III.

13. iii. 27. 51° 01′ 30″ S, 64° 04′ 30″ W. Dredge, 95 m.

Fine dark sand with little mud and practically devoid of organic remains. A few fragments of worm tubes were seen, and the following Foraminifera only were obtained from the cleaned material: *Psammosphaera fusca*, two coarsely built specimens; *Cassidulina crassa*, one small specimen; *Lagena squamosa*, one specimen.

WS 79. TS 479. A III.

13. iii. 27. 51° 01′ 30″ S, 64° 59′ 30″ W. Dredge, 132 m.

Dark sand with little mud and very few organic remains of any kind. Foraminifera very rare.

WS 80. TS 481. B III.

14. iii. 27. 50° 57′ 00″ S, 63° 37′ 30″ W. Dredge, 152 m.

Coarse dark sand with little mud and scanty organisms. Foraminifera scarce, except *Cassidulina crassa* and *Uvigerina angulosa*, both of which were abundant. A few selected specimens of *Protobotellina cylindrica* and a specimen of *Hyperammina friabilis* obtained from trawl residues at this station were also received.

WS 83. TS 507 A/B. B IV.

24. iii. 27. Fourteen miles S 64° W of George Island, East Falkland Islands. Dredge, 137 m.

Shell sand with rounded and highly polished sand grains. Very few Foraminifera in the coarser grades, but the finer grades consist very largely of *Cassidulinae* which formed an estimated 90 per cent. of the material, the species attaining a large size. Other Foraminifera present in great variety but smaller numbers, the genus *Lagena* being particularly varied. Among the rarer forms listed were *Cristellaria angulata*, *Lingulina translucida*, nom.nov., *L. falcata* and *Chilostomella oolina*.

WS 84. TS 521. C IV.

24. iii. 27. 7½ miles S 9° W of Sea Lion Island, East Falkland Islands. Dredge, 75 m.

A large quantity of dried sand, about equal proportions of calcareous and siliceous particles. Foraminifera were not prominent in the material except *Cassidulina crassa* and *C. subglobosa*. A long list of the ordinary Falkland species, with few forms of special interest.

WS 86. TS 517. B IV.

3. iv. 27. 53° 53′ 30″ S, 60° 34′ 30″ W. Dredge, 151 m.

Coarse shell sand with plentiful Foraminifera in the finer material. *Cassidulina crassa*, *Ehrenbergina pupa* and *Uvigerina angulosa* the dominant types. Many Lagenidae and Miliolidae.

WS 87. TS 524. Fossils, TS 525. C V.

3. iv. 27. 54° 07′ 30″ S, 58° 16′ 00″ W. Dredge, 96 m.

Dark sand with stones and shells. The material yielded a long list of species, *Cassidulina crassa* and *Uvigerina angulosa* as usual very abundant. Among the notable records were *Heronallenia* (*Discorbis*) *kempii* and *Discorbis plana*, sp.n., *Cornuspira denticulata* and *Spirillina tuberculata*.

A great many species of fossil Foraminifera, perhaps derived from a submarine outcrop, were observed at this station.

WS 88. TS 512, 513, 514. A IV.

6. iv. 27. 54° 00′ 00″ S, 64° 57′ 30″ W. Dredge, 118 m.

Coarse sand, about equal proportions of Polyzoa and shell débris, and brown angular mineral sand with very little mud. The coarser material was encrusted with *Gypsina inhaerens*. Foraminifera abundant and varied. *Cassidulina crassa* very common and very large. *Anomalina vermiculata* common in all stages of growth. This was one of the richest gatherings received and yielded a very long list, including several new species and many rarities, especially among the Lagenidae.

WS 89. TS 508. A IV.

7. iv. 27. 9 miles N 21° E of Arenas Point Light, Tierra del Fuego. Dredge, 23 m.

Gravel with blue mud. Foraminifera fairly numerous and varied. Many species of *Lagena*, including *L. laureata*, sp.n., and *L. digitale*, sp.n.

WS 90. TS 504. A IV.

7. iv. 27. 13 miles N 83° E of Cape Virgins Light, Argentina. Dredge, 82 m.

Dark brown sand with some greenish mud. Little coarse material and few sessile forms. The finer material yielded a long list of species, but the specimens as a whole were small and starved. *Cassidulina crassa* very common, but none of the large individuals so typical of most Falkland dredgings. Among the rarer forms were *Lagena danica*, *L. digitale*, sp.n., *Nodosaria lepidula* and *Cristellaria tenuissima*, sp.n.

WS 91. TS 509. B IV.

8. iv. 27. 52° 53′ 45″ S, 64° 37′ 30″ W. Dredge, 191 m.

Dark sand with many shell fragments but little mud. Foraminifera fairly abundant, *Cassidulina crassa* being dominant, with *Uvigerina angulosa* almost equally numerous. A long list of species was recorded but few of particular interest, among them, however, being a specimen of *Nonionella chiliensis*.

WS 92. TS 502. A III.

8. iv. 27. 51° 58′ 30″ S, 65° 01′ 00″ W. Dredge, 145 m.

Gravel and sand with little mud. The sand grains rounded and polished, with the result that sessile forms were very rare. Foraminifera abundant and varied, but poorly developed as regards size. *Cassidulina crassa*, *C. parkeriana*, *Uvigerina angulosa*, *Globigerina bulloides*, *Truncatulina lobatula*, *T. variabilis* and *T. ungeriana*, all very common and forming a large proportion of the material. Among the more interesting species were *Heronallenia* (*Discorbis*) *kempii*, *Discorbis tricamerata*, sp.n., and *D. chasteri*, *Patellinoides conica*, gen. et sp.n., and many species of *Lagena*.

WS 93. TS 503. B III.

9. iv. 27. 7 miles S 80° W of Beaver Island, West Falkland Islands. Dredge, 133 m.

Shell sand with little mud. Very few Foraminifera in the coarser material, but the finer siftings contained an abundant fauna. Two or three species of *Cassidulina*, *Ehrenbergina pupa* and *Uvigerina angulosa* formed probably 95 per cent of the material. Miliolids were very infrequent though many species were recorded. *Lagena* abundant and varied. This was one of the richest gatherings examined and yielded over 100 species including many rare and new forms, *Lingulina falcata*, sp.n., *L. quadrata*, *L. vitrea*, sp.n., etc.

WS 94. No TS (station slide). A III.

16. iv. 27. 50° 00′ 15″ S, 64° 57′ 45″ W. Dredge, 110 m.

Brown sand with hardly any mud or coarse material, and practically devoid of organic remains. Nothing found except *Miliolina circularis* 1, *Tholosina bulla* 1, *Psammosphaera fusca* 2, *Truncatulina* sp. (worn) 2.

WS 95. TS 487. A II.

17. iv. 27. 48° 58′ 15″ S, 64° 45′ 00″ W. Dredge, 109 m.

Gravel and sand, with shell fragments but little mud. Foraminifera very scanty, the only species occurring in any number being various species of *Truncatulina* and *Pulvinulina karsteni*. Nothing of particular interest.

WS 96. No TS (station slide). A II.

17. iv. 27. 48° 00′ 45″ S, 64° 58′ 00″ W. Dredge, 96 m.

Coarse dark brown sand, without mud and devoid of organic remains. The only species observed was *Pulvinulina karsteni*, two specimens.

WS 97. TS 489. B II.

18. iv. 27. 49° 00′ 30″ S, 61° 58′ 00″ W. Residues from trawl, 146.

Muddy brown sand with pebbles, many covered with sessile species. Foraminifera abundant and varied. *Cassidulina* spp. dominant. Among the interesting novelties at this station were *Cassidulina crassa* var. *porrecta*, var.n., and *Cristellaria tenuissima*, sp.n.

WS 98. TS 485. B II.

18. iv. 27. 49° 54′ 15″ S, 60° 35′ 30″ W. Dredge, 173 m.

Dark olive-green sandy mud with abundant Foraminifera, *Uvigerina* spp. and *Cassidulina* spp. dominant, but not many other species and none of particular interest.

WS 99. TS 501. C II.

19. iv. 27. 49° 42′ 00″ S, 59° 14′ 30″ W. Dredge, 251 m.

Dark green tenacious mud, which, when washed on 200 mesh silk, left a residue of very fine angular grey sand with hardly any coarse particles. Foraminifera formed a very small proportion of

the residue and were principally dead shells. Among the more notable forms were *Bulimina ovula*, *Cyclammina cancellata*, *Pulvinulina umbonata* and *Anomalina umbilicatula*, sp.n. Many species of *Lagena*.

WS 108. TS 488. B II.

25. iv. 27. 48° 30′ 45″ S, 63° 33′ 45″ W. Dredge, 118 m.

Fine brown sand without mud, and practically devoid of organisms. Careful elutriation yielded twenty-four species of Foraminifera mostly represented by a few specimens only, none being of particular interest.

WS 109. TS 500. C III.

26. iv. 27. 50° 18′ 48″ S, 58° 28′ 30″ W. Dredge, 145 m.

Dark grey sand with little mud, and scanty organic remains. *Uvigerina angulosa* dominant, with *Cassidulina crassa*, *subglobosa* and *parkeriana* present in almost equal abundance. *Haplophragmoides crassimargo* and *Hyperammina friabilis* were common. Most other species sparingly represented, though the list was fairly long.

WS 210. TS 484. B III.

29. v. 28. 50° 17′ 00″ S, 60° 06′ 00″ W. Dredge, 161 m.

Fine olive-green muddy sand with abundant Foraminifera, *Uvigerina angulosa* dominant, all other species except *Cassidulina crassa*, *Truncatulina lobatula* and *Pulvinulina karsteni* scantily represented.

Some fragmentary hydroids encrusted with *Truncatulina* and three selected specimens of *Miliolina procera* were also received from nets on trawl.

WS 213. TS 486. B II.

30. v. 28. 49° 22′ 00″ S, 60° 10′ 00″ W. Nets on trawl, 249–239 m.

A small quantity of organic débris and sand yielded a few interesting species including *Tholosina protea*, sp.n., *T. vesicularis* and var. *erecta*.

A few specimens of *Protobotellina cylindrica* were also received which had been selected from residues on the ship.

WS 215. TS 491. B I.

31. v. 28. 47° 37′ 00″ S, 60° 50′ 00″ W. Dredge, 219 m.

Fine sand, dark in colour and muddy. Foraminifera rather scanty, *Uvigerina* dominant. Among the species of interest were *Cyclammina cancellata* and *Nodosaria pauperata*, both megalospheric and microspheric, and *Vaginulina spinigera*.

WS 217. TS 493. B I.

1. vi. 28. 46° 28′ 00″ S, 60° 18′ 00″ W. Dredge, 146 m.

Dark olive-green muddy sand with very little coarse material. Foraminifera plentiful but pauperate. *Cassidulina* spp. and *Uvigerina* spp. as usual dominant. Many species of *Lagena* occurred at this station.

WS 219. TS 492. B I.

3. vi. 28. 47° 06′ 00″ S, 62° 12′ 00″ W. Dredge, 115 m.

Dark brown muddy sand with few organisms of any kind. The Foraminifera mostly dead and worn shells. Fragments of *Jaculella obtusa* were abundant, as also were *Cassidulina crassa* and *Truncatulina bradyana*. The few other species were of very rare occurrence.

WS 221. TS 490. A I.

4. vi. 28. 47° 23′ 00″ S, 65° 10′ 00″ W. Dredge, 76 m.

Muddy gravel with shells. Many sessile species on the larger fragments, including *Dendrophrya erecta*, *Dendronina papillata*, *Nubecularia lucifuga* and *Tholosina vesicularis* var. *erecta*. The finer material yielded a long list of interesting species, including *Webbinella hemisphaerica*, *Nodosaria pellita* and *Nonionella iridea*, sp.n.

WS 225. TS 483 A/B. B III.

9. vi. 28. 50° 20′ 00″ S, 62° 30′ 00″ W. Dredge, 162 m.

Dark olive-green muddy sand with stones which were encrusted with sessile species, *Placopsilina cenomana* being dominant. Foraminifera not very numerous in the finer material except *Cassidulina crassa*, *Ehrenbergina pupa*, *Uvigerina angulosa* and *Truncatulina lobatula*, all abundant.

A small quantity of organic débris and sand, from nets on trawl, yielded the same species with some additions, including *Biloculina globulus*, *Ammolagena clavata* and *Cornuspira denticulata*, sp.n.

WS 229. No TS (station slide). A III.

1. vii. 28. 50° 35′ 00″ S, 57° 20′ 00″ W. Nets on trawl, 210–271 m.

Some selected specimens of *Protobotellina cylindrica* and one specimen of *Hyperammina friabilis* were received from this station. No other material.

WS 242. No TS (station slide). A III.

17. vii. 28. 51° 06′ 00″ S, 66° 30′ 00″ W. Dredge, 119 m.

Dark brown sand. Among the coarser material a few pebbles yielded sessile species, including *Tholosina vesicularis* var. *erecta*. The finer material was pure sand.

WS 243. TS 480 A/B. A III.

17. vii. 28. 51° 06′ 00″ S, 64° 30′ 00″ W. 144 m. Residues from trawl and nets attached to trawl.

Organic débris of many kinds chiefly Polyzoan and sponge, often covered with sessile Foraminifera. *Tholosina protea*, sp.n., was common on Hydroids; *Psammatodendron indivisum*, sp.n., *Dendronina papillata* and *Tholosina vesicularis* also occurred. Many selected specimens of *Protobotellina cylindrica* were received from this station ranging up to $2\frac{1}{2}$ inches in length. The muddy sand washed from the residues contained very few Foraminifera, all of the common Falkland types.

WS 245. TS 505. B IV.

18. vii. 28. 52° 36′ 00″ S, 63° 40′ 00″ W. Dredge, 304 m.

Dark olive-green muddy sand. Very few Foraminifera in the coarser material, but in the fine they were abundant, *Uvigerina angulosa*, *Cassidulina* spp. and *Ehrenbergina pupa* being dominant. Many species of *Lagena*, notably *L. clathrata*. *Patellinoides depressa*, sp.n. and *Anomalina umbilicatula*, sp.n., were also found.

WS 246. TS 506 A/B. B IV.

19. vii. 28. 52° 25′ 00″ S, 61° 00′ 00″ W. Nets on trawl, 267–208 m.

Organic débris of all kinds with many shell fragments and some sand. The material was very difficult to work over, but yielded a great many species, including *Hyperammina clavigera*, sp.n., *H. novae-zealandiae*, *Reophax cushmani*, nom.nov., *R. distans* var. *pseudo-distans*, *Tholosina protea*, sp.n., *Webbinella depressa*, sp.n., *Polytrema* (?), etc.

WS 248. TS 522. C IV.

20. vii. 28. 52° 40′ 00″ S, 58° 30′ 00″ W. Dredge, 210 m.

Muddy green-grey sand with shell débris, containing abundant Foraminifera, estimated at 20 per cent of the total material. *Cassidulina crassa*, *C. subglobosa*, *Ehrenbergina pupa* and *Uvigerina angulosa* were dominant, and with *Globigerina conglomerata* and *G. pachyderma* formed the bulk of the gathering. *Lagenae* were varied, but with the exception *L. fimbriata* and *L. biancae* not plentiful.

WS 408. TS 516. B IV.

26. ii. 29. 53° 50′ 00″ S, 62° 10′ 00″ W. Baillie sounding rod, 454 m.

Dark grey muddy sand which yielded a very long list of species. *Cassidulina crassa*, *Uvigerina striata*, *Globigerina bulloides*, *G. dutertrei*, *G. triloba*, *Globorotalia scitula*, *G. truncatulinoides*, *Pulvinulina elegans* and *P. umbonata* were all extremely common. Among the rarer forms were *Patellinoides depressa*, sp.n., *Lingulina quadrata*, spinous forms of *Nodosaria laevigata* and *N. rotundata*, and *Lagena lagenoides* var. *radiata*.

WS 409. TS 510. B IV.

26. ii. 29. 53° 10′ 00″ S, 60° 31′ 00″ W. Baillie sounding rod, 567 m.

Three cc. of grey sandy mud which was washed on 200 mesh silk. Foraminifera were about 25 per cent of the residue, all small, specimens of *Globigerina* forming the bulk of the material. *Cassidulina laevigata* was much more abundant than *C. crassa*, contrary to the usual proportion. A good many species were listed but none of outstanding interest.

WS 431. TS 523. D IV.

1. v. 29. 52° 18′ 00″ S, 50° 59′ 00″ W. Baillie sounding rod, 3411 m.

A few grains of sand and glauconite with *Globigerinae* were collected on a filter paper. They yielded seven species of *Globigerina* and three other forms, viz. *Biloculina depressa*, *Psammosphaera fusca* and *Globorotalia crassa*.

WS 432. TS 520. D III.

2. v. 29. 51° 56′ 30″ S, 53° 28′ 00″ W. Baillie sounding rod, 2432 m.

A few grains of sand and glauconite with Foraminifera were collected on a filter paper. *Globigerinae* formed the bulk of the material, six species being present. *G. pachyderma* was dominant, being followed in order of frequency by *G. bulloides*, *G. dutertrei*, *G. conglomerata*, *G. triloba* and *G. elevata*, the last represented by a single specimen. *Pullenia obliquiloculata* was very plentiful. Five other species were recorded, mostly rare, or single specimens.

WS 433. TS 494 A. C III.

5. iv. 29. 51° 44′ S, 56° 23′ W. Bottom sample, 1035 m.

Light grey mud with dark spots. Residue *Globigerina* ooze, Radiolaria and glauconite granules in about equal proportions. Many interesting species of Foraminifera of deep water types.

WS 531. TS 517 A. B V.

5. iv. 30. 54° 25′ 30″ S, 61° 25′ 30″ W. Baillie sounding rod, 118 m.

A small quantity of grey shell sand with abundant Foraminifera. Among the rarities recorded are *Cornuspira foliacea*, *Technitella nitida*, sp.n., *Bifarina porrecta* and *Rotalia clathrata*.

No station no. TS 517 B.

5. iv. 30 (A). 54° 33′ 30″ S, 61° 22′ 00″ W. Baillie sounding rod, N.P.D. rod, 124 m.

About 1 cc. of grey shell sand yielded many Foraminifera, including five species of *Globigerina* and eight of *Lagena*.

No station no. TS 517 C.

6. iv. 30. 54° 35′ 30″ S, 61° 25′ 00″ W. Baillie sounding rod, 320 m.

A small quantity of greenish grey sand, the colour being due to the presence of glauconite. Foraminifera were abundant and varied. *Cassidulina*, *Globigerina* and *Uvigerina* spp. dominant. Among the rarer forms recorded are *Nodosaria capitata*, *Heronallenia* (*Discorbis*) *kempii* and *Rotalia clathrata*.

No station no. TS 517 D.

5. iv. 30 (B). 54° 41′ 05″ S, 61° 19′ 00″ W. Baillie sounding rod, 569 m.

A very small quantity of dark grey sand with shell fragments and abundant Foraminifera. *Uvigerina angulosa* and *Globigerina conglomerata* and *G. inflata* were the dominant species, *Cassidulina* being comparatively small and rare. The genus *Lagena* was represented by no fewer than fourteen species out of the forty-four species recorded from the station.

The material represented by TSS 517 B, C and D, was received too late for more than casual examination, or to be marked on the Chart. A few dominant forms, and noteworthy species only, are recorded. They are all in the same square BV on the chart.

LIST OF NEW GENERA, SPECIES AND VARIETIES

A few specimens, possibly new species, remain undescribed pending the arrival of further material.

SYSTEMATIC ACCOUNT

Order FORAMINIFERA

Family MILIOLIDAE

Sub-family *NUBECULARIINAE*

Genus **Nubecularia**, Defrance, 1825

1. **Nubecularia lucifuga**, Defrance.

Nubecularia lucifuga, Defrance, 1825, *Dict. Sci. Nat.* (*Strasburg*, 1816–30), XXXV, p. 210; *Atlas Zooph.* pl. xliv, fig. 3.
Nubecularia lucifuga, Sidebottom, 1904, etc., RFD, 1904, p. 2, pl. ii, figs. 1–4.

Three stations: WS 87, 88, 221.

Small specimens attached to stones and shells are not uncommon at WS 88 and 221. They may have been overlooked at other stations.

* These species were figured and described in *Journal of the Royal Microscopical Society* in 1929 (Vol. XLIX, pp. 324–334, pls. i–iv). The descriptions and plates are repeated in this Report by the courtesy of the Council of the Society.

Sub-family *MILIOLININAE*

Genus **Biloculina**, d'Orbigny, 1826

2. **Biloculina depressa**, d'Orbigny.

Biloculina depressa, d'Orbigny, 1826, TMC, p. 298, No. 7, Modèle no. 91.
Biloculina ringens var. *carinata*, Williamson, 1858, RFGB, p. 79, pl. vii, figs. 172–4.

Nine stations: 230, 236; WS 83, 91, 108, 245, 408, 431, 433.

Typical everywhere, but uncommon excepting at WS 408, where it is abundant and well developed.

3. **Biloculina murrhyna**, Schwager.

Biloculina murrhyna, Schwager, 1866, FKN, p. 203, pl. iv, figs. 15 *a*, *b*.
Biloculina murrhyna, Cushman, 1910, etc., FNP, 1917, p. 75, pl. xxviii, fig. 3; pl. xxix, fig. 1.

Seven stations: 228, 235, 236; WS 83, 215, 217, 408.

Generally rare, but abundant at WS 408, where a complete range, from the megalo- and microspheric young to large individuals, was found. Very large specimens at WS 217. At some station it is very small and poorly developed.

4. **Biloculina serrata**, Bailey.

Biloculina serrata, Bailey, 1861, *Boston Journ. Nat. Hist.* VII (3), p. 350, pl. viii, E.
Biloculina depressa var. *serrata*, Brady, 1884, FC, p. 146, pl. iii, fig. 3.
Biloculina serrata, Cushman, 1910, etc., FNP, 1917, p. 75, pl. xxix, fig. 2.

Three stations: 228; WS 217, 408.

Good single specimens at each station. At 228 and WS 408, the serration is confined to the aboral half of the shell.

5. **Biloculina sarsi**, Schlumberger.

Biloculina ringens, Brady, 1884, FC, p. 139.
Biloculina sarsi, Schlumberger, 1891, BGF, p. 553 (in the reprints, p. 166), text-figs. 10–12, pl. ix, figs. 55–9.

One station: WS 221.

Occurs at this station, large and typical.

6. **Biloculina elongata**, d'Orbigny.

Biloculina elongata, d'Orbigny, 1826, TMC, p. 298, no. 4.
Biloculina elongata, Schlumberger, 1891, BGF, p. 571, figs. 35, 36, pls. xi and xii, figs. 87–9.

Twelve stations: 388; WS 71, 84, 86, 87, 88, 92, 93, 97, 109, 221, 246.

Generally distributed and very common.

7. **Biloculina patagonica**, d'Orbigny (Plate VI, figs. 4–6).

Biloculina patagonica, d'Orbigny, 1839, FAM, p. 65, pl. iii, figs. 15–17.
Biloculina ringens var. *patagonica*, Williamson, 1858, RFGB, p. 80, pl. vii, figs. 175, 176.

Eight stations: 388; WS 84, 86, 87, 88, 91, 97, 221.

This local form is the only representative of the species at WS 91. At the other stations it appears in company with typical *B. elongata*. Although d'Orbigny's specific name has been very little used, this pear-shaped form of *B. elongata* is not uncommon wherever that species occurs. At several stations it passes almost imperceptibly into *B. elongata*. The Type slide in Paris, labelled *B. patagonica*, does not contain any *Biloculina*, but only a stained Miliolid.

8. **Biloculina peruviana**, d'Orbigny (Plate VI, figs. 7–9).

Biloculina peruviana, d'Orbigny, 1839, FAM, p. 68, pl. ix, figs. 1–3.

Four stations: 48, 388; WS 84, 86.

A considerable number of specimens, agreeing generally with d'Orbigny's figures, but slightly less globular. The bifurcate tooth is very characteristic, and in this differs from d'Orbigny's figure of *B. bulloides*, which has a simple tooth. Brady regarded *B. peruviana* as a synonym of the latter species. *B. peruviana* does not occur in d'Orbigny's list of the Falkland Islands species, but is recorded from Peru only. It has apparently a wide distribution, probably recorded as *B. bulloides*. The Type was not to be found in Paris.

9. **Biloculina isabelleana**, d'Orbigny (Plate VI, figs. 1–3).

Biloculina isabelleana, d'Orbigny, 1839, FAM, p. 66, pl. viii, figs. 17–19.

Three stations: 388; WS 93, 246.

This species, which d'Orbigny found in the Falkland area "in the Polyp zone" and which he very justly describes as distinguished "par sa forme bombée", occurs at a few stations only. It is a very distinctive form, and the Paris Types conform in all respects with our specimens. Length, 0·70–0·80 mm.; breadth, 0·60–0·75 mm.

10. **Biloculina anomala**, Schlumberger.

Biloculina anomala, Schlumberger, 1891, BGF, p. 569 (in the reprints p. 182), text-figs. 32–4, pl. xi, figs. 84–6, pl. xii, figs. 101.
Biloculina anomala, Cushman, 1921, FP, p. 474, pl. xcvi, figs. 1 *a*, *b*, *c*.

One station: WS 87.

A few fairly large specimens at this station.

10 A. **Biloculina vespertilio**, Schlumberger.

Biloculina ringens, Brady, 1884, FC, p. 142, pl. ii, fig. 8.
Biloculina vespertilio, Schlumberger, 1891, BGF, p. 561 (in the reprints, p. 174), figs. 20–2, pl. x, figs. 74–6.
Biloculina vespertilio, Cushman, 1910, etc., FNP, 1917, p. 77, pl. xxx, fig. 1, text-figs. 37–9.

One station: 388.

Common, and of large size.

11. **Biloculina globulus**, Bornemann.

Biloculina globulus, Bornemann, 1855, FSH, p. 349, pl. xix, fig. 3.
Biloculina globulus, Schlumberger, 1891, BGF, p. 575 (in the reprints, p. 188), text-figs. 42–4, pl. xii, figs. 97–100.

Ten stations: WS 71, 80, 83, 86, 88, 90, 91, 92, 221, 225.

The specimens are large but not typical, being somewhat compressed. At WS 80, a single small specimen occurred, exactly comparable with Bornemann's original figure.

Genus Flintia, Schubert, 1911

11 A. **Flintia robusta** (Brady).

Spiroloculina robusta, Brady, 1884, FC, p. 150, pl. ix, figs. 7, 8.
Spiroloculina robusta, Flint, 1899, RFA, p. 296, pl. xlii, figs. 1, 2.
Flintia (*Spiroloculina*) *robusta*, Schubert, 1911, FFB, p. 124.
Flintia robusta, Cushman, 1918, etc., FAO, 1929, p. 75, pl. xx, figs. 1, 2.

One station: 388.

A single fine specimen.

Genus Spiroloculina, d'Orbigny, 1826

It is perhaps noteworthy that not a single specimen referable to this genus was found in the Falkland material. Although generally a warm-water form, in the northern hemisphere the genus attains much higher latitudes than in the Falkland area.

Genus Miliolina, Williamson, 1858

12. **Miliolina seminulum** (Linné) (Plate VI, figs. 25–40).

Serpula seminulum, Linné, 1767, SN (ed. xii), p. 1264, no. 791; SN (ed. xiii), p. 3739, no. 2.
Miliolina seminulum, Brady, 1884, FC, p. 157, pl. v, fig. 6 (references).
Quinqueloculina araucana, d'Orbigny, 1839, FAM, p. 76, pl. ix, figs. 13–15.
Quinqueloculina isabellei, d'Orbigny, 1839, FAM, p. 74, pl. iv, figs. 17–19.
Quinqueloculina magellanica, d'Orbigny, 1839, FAM, p. 77, pl. ix, figs. 19–21.

Twenty-four stations: 48, 51, 228, 388; WS 71, 73, 76, 83, 84, 86, 87, 88, 90, 91, 93, 95, 99, 109, 217, 219, 221, 225, 242, 246.

Universally distributed, often very abundant and attaining very large dimensions (Plate VI, figs. 34–36). It also presents nearly all the variations commonly associated with this species. Naturally the most abundant of the variations are those associated by d'Orbigny with the South American area (FAM, 1839), particularly his *Quinqueloculina magellanica*, of which we give figures (Plate VI, figs. 25–27), although specimens exactly comparable with his figures are not particularly abundant, the best occurring at WS 84, 86. The peculiarity assigned by the author to this species, "très lisse, brillante", is especially

characteristic of the *M. seminulum* group in the Falkland Islands material. *Q. araucana* (d'Orbigny) which was recorded by that author only from Valparaiso, on the Chilean coast, and which differs from *Q. magellanica* mainly in its narrower outlines and less acute peripheral edge, occurs but very rarely, the best being at WS 86, 108 and 221 (see Plate VI, figs. 28–30). The Types of *Q. araucana* are deeply stained with iron, but the sutures are very strongly marked and we have no doubt that they are in general agreement with d'Orbigny's figure. *Quinqueloculina isabellei* is characterized by a more compressed shell with inflated chambers and depressed sutures. We have notes of its occurrence at six stations only, viz. 388, WS 87, 88, 90, 91, 93. It is probably more widely distributed but escaped observation. The Type was not to be found in Paris.

Among the Paris Types the tube labelled "*Q. magellanica*, Îles Malouines", contains nine large Miliolids in good condition. Some of them are in agreement with d'Orbigny's figures, but the others cover a wide range of variation within the species *M. seminulum*, including the sigmoiline form referred to below. One of the specimens is nearer *M. vulgaris* than *M. seminulum*.

Among our specimens a form with somewhat recurved angular edge suggesting a sigmoiline structure arrests attention (Plate VI, figs. 31–3). It was at first assumed to be a *Sigmoilina*, although its general resemblance to *M. seminulum* and its constant association with that species brought it under suspicion. Its Milioline nature having been established, it seemed probable that it would prove to be the microspheric form of that species, in view of the fact that Schlumberger in his sections of *M. seminulum* (S. 1893, MGM, p. 67 [in the reprints, p. 209], figs. 15, 16) indicates a similar "pseudo-sigmoiline" curve in the external wall of the microspheric form. But a series of sections has proved the existence of both megalospheric and microspheric individuals in each form, the latter as usual being very uncommon (Plate VI, figs. 37–40). The megalosphere of the angular sigmoiline form appears to be invariably smaller than in the normal *M. seminulum*, and it seems probable that the species exhibits the "trimorphism" of Hofker, or "polymorphism", as has been alternately suggested for the phenomenon.

The best specimens of the sigmoiline form were obtained at 388 and WS 84, where large and highly polished individuals are common.

Goës in his Arctic and Scandinavian Foraminifera (G. 1894, ASF, p. 108, pl. xviii, figs. 838 *c*, *d*) gives sections of the two forms of *M. seminulum*, which, although less distinctive than Schlumberger's so far as external characteristics go, bring out what he regarded as a "sigmoiline" arrangement of the chambers in this species. Our own sections seem to prove that, while the microspheric form is distinctly sigmoiline in the arrangement of its chambers, no similar curve can be made out in the megalospheric form.

13. **Miliolina patagonica** (d'Orbigny) (Plate VI, figs. 10–12).

Quinqueloculina patagonica, d'Orbigny, 1839, FAM, p. 74, pl. iv, figs. 14–16.

Three stations: WS 83, 217, 245.

The occurrence of d'Orbigny's little form at these stations is worth recording,

although it has no very distinctive specific features. The specimens agree very well with d'Orbigny's figures, but, except at WS 217, the surface of the shell is invariably dull and rough, whereas d'Orbigny describes it as being bright and shining. The Type was not to be found in Paris.

14. **Miliolina vulgaris** (d'Orbigny).

Quinqueloculina vulgaris, d'Orbigny, 1826, TMC, p. 302, no. 33.
Quinqueloculina vulgaris, Schlumberger, 1893, MGM, p. 65 (in the reprints, p. 207), pl. ii, figs. 65–6, and woodcuts 13–14.

Seven stations: 388; WS 71, 84, 87, 88, 89, 215.

Common. Very fine and typical specimens at WS 87, identical with the Type-specimens in Paris. The figure in Soldani (S. 1789–98, T, pt iii, tab. 152, fig. E), upon which d'Orbigny based his species, is highly unsatisfactory, but d'Orbigny's localities, principally Mediterranean, were sufficient to justify Schlumberger in his identifications when he revived the name.

15. **Miliolina oblonga** (Montagu).

Vermiculum oblongum, Montagu, 1803–8, TB, p. 522, pl. xiv, fig. 9.
Miliolina seminulum var. *oblonga*, Williamson, 1858, RFGB, p. 86, pl. vii, figs. 186, 187.
Miliolina seminulum, Brady, 1884, FC, p. 160, pl. v, fig. 4.

Nine stations: 388; WS 71, 79, 84, 86, 87, 88, 90, 93.

Common. The best specimens at WS 87 and 88, where a complete series of individuals, from immature young to very large adult specimens, was obtained. The dominant type at all the stations is rather small and square-ended, a parallelogram with rounded corners.

16. **Miliolina bosciana** (d'Orbigny).

Quinqueloculina bosciana, d'Orbigny, 1839, FC, p. 191, pl. xi, figs. 22–4.
Miliolina bosciana, Chapman, 1900, FLF, p. 177, pl. xix, fig. 7.

One station: WS 88.

Typical specimens, rather thick-shelled, and quite in conformity with the Type in Paris.

17. **Miliolina procera**, Goës.

Miliolina procera, Goës, 1896, DOA, p. 82, pl. vii, figs. 7–9.
Miliolina procera, Cushman, 1910, etc., FNP, 1917, p. 45, pl. xix, fig. 2.

Two stations: WS 210, 215.

Two fine specimens from WS 215, and three from WS 210, agree very well with the figures of Goës, and even exhibit the faint longitudinal striation to which he refers in his text, but which is not shown in his figures. The aperture in all our specimens is normal, and not the undulating irregular slit which Goës reports as being usually characteristic of the species.

18. **Miliolina subrotunda** (Montagu).

Vermiculum subrotundum, Montagu, 1803–8, TB, pt 2, p. 521.
Miliolina subrotunda, Brady, 1884, FC, p. 168, pl. v, figs. 10, 11.
Miliolina subrotunda, Goës, 1894, ASF, p. 109, pl. xix, figs. 846, 847.

Thirteen stations: 48, 51, 53, 388; WS 71, 80, 88, 89, 90, 108, 225, 245, 248.

Frequent at most of the stations, the best at 53 and WS 71 and 88. At WS 248, a specimen with a hauerine development of the later chambers was observed. At 53 a specimen practically identical with the hauerine variety figured by us from south Cornwall (H.-A. & E. 1916, FSC, p. 35, pl. v, figs. 6–8) was found. As a general rule the specimens are small, tending towards the pauperate d'Orbignyan species, *Q. peruviana* and *Q. meridionalis*. The Falkland Islands specimens never attain the robust development and size which marks the species in British waters.

19. **Miliolina meridionalis** (d'Orbigny) (Plate VI, figs. 22–24).

Quinqueloculina meridionalis, d'Orbigny, 1839, FAM, p. 75, pl. iv, figs. 1–3 and 10–13.

The distribution follows that of *M. subrotunda* of which it is a local d'Orbignyan variation. In Paris the Type tube contains one specimen labelled "Amérique méridionale". It was encrusted with crystals of efflorescence. When these were very carefully removed, the specimen appeared in very fair condition, apparently *M. valvularis*, at any rate having no resemblance to d'Orbigny's figure.

20. **Miliolina lamarckiana** (d'Orbigny).

Quinqueloculina lamarckiana, d'Orbigny, 1839, FC, p. 189, pl. xi, figs. 14–15.
Quinqueloculina auberiana, d'Orbigny, 1839, FC, p. 193, pl. xii, figs. 1–3.
Miliolina auberiana, Goës, 1894, ASF, p. 109, pl. xix, fig. 844.
Miliolina lamarckiana, Heron-Allen and Earland, 1930, FPD, p. 57.

Two stations: WS 83, 87.

The specimens are far from typical and have somewhat inflated chambers. In Paris there are two Type tubes labelled "*Q. lamarckiana*, Cuba", and two labelled "*Q. auberiana*, Cuba". Of the *Q. lamarckiana*, one tube contains nothing but unrecognizable fragments, the other contains thirteen specimens, some in good condition, others more or less destroyed by efflorescence. It seems impossible that these can have been the original d'Orbigny Types, for they cover *Q. lamarckiana*, *auberiana*, and *cuvieriana*. One or two are excellent specimens of *Q. lamarckiana* as figured by d'Orbigny, the rest we think should be disregarded as being probably later additions to the tube. The *Q. auberiana* "Types" are even more unsatisfactory. One tube contains only a single specimen of *Massilina secans* (d'Orbigny), the other contains two smaller shells in a very bad state of preservation; one is quite unrecognizable, the other is *Miliolina subrotunda* (Montagu).

21. **Miliolina contorta** (d'Orbigny).

Quinqueloculina contorta, d'Orbigny, 1846, FFV, p. 298, pl. xx, figs. 4–6.
Miliolina contorta, Goës, 1894, ASF, p. 111, pl. xx, figs. 851, 852.

Eight stations: 48, 388; WS 71, 87, 88, 90, 93, 99.

The specimens are large and well developed, especially at WS 71 and 93. They are rather broader and shorter than the d'Orbignyan figure suggests, but the Type specimen is not to be found in Paris for comparison.

22. **Miliolina inca** (d'Orbigny) (Plate VI, figs. 13–15).

Quinqueloculina inca, d'Orbigny, 1839, FAM, p. 75, pl. iv, figs. 20–2.

Three stations: WS 87, 88, 93.

A single specimen at each station, agreeing with d'Orbigny's figure. The striae rather faint in the specimens from WS 87, 88, which are young, but are much coarser in the adult specimen from WS 93. The Type is not to be found in Paris.

23. **Miliolina boueana**, d'Orbigny.

Quinqueloculina boueana, d'Orbigny, 1846, FFV, p. 293, pl. xix, figs. 7–9.
Miliolina boueana, Brady, 1884, FC, p. 173, pl. vii, figs. 13 *a*, *b*.
Miliolina boueana, Costa, 1853, etc., PRN, 1856, p. 329, pl. xxv, fig. 15.

Four stations: 48; WS 84, 93, 245.

Rare. The specimens are poorly developed, the best are at 48. This Type also is missing.

24. **Miliolina costata** (d'Orbigny).

Quinqueloculina costata, d'Orbigny, 1826, TMC, p. 301, no. 3.
Quinqueloculina costata, Schlumberger, 1893, MGM, p. 69 (in the reprints, p. 211), text-fig. 20, pl. iii, figs. 75–6.
Miliolina costata, Heron-Allen and Earland, 1914, etc., FKA, 1915, p. 579, pl. xliv, figs. 9–11.

One station: WS 88.

Several very good specimens, agreeing with the one remaining and recognizable Type in Paris.

25. **Miliolina pygmaea** (Reuss).

Quinqueloculina pygmaea, Reuss, 1849–50, FOT, p. 384, pl. v (1), fig. 3.
Quinqueloculina lucida, Karrer, 1868, MFKB, p. 147, pl. ii, fig. 7.
Miliolina pygmaea, Heron-Allen and Earland, 1916, FWS, p. 211, pl. xxxix, figs. 10–16 (only).

Fourteen stations: WS 80, 83, 88, 89, 90, 91, 93, 99, 108, 210, 215, 217, 225, 408.

The specimens are usually few in number, but at WS 83 they are extraordinarily abundant. All the specimens agree, on the whole, better with the description and figure of *Quinqueloculina lucida*, Karrer, *ut supra*, in which the chambers are slightly more inflated and the sutural depressions deeper than in Reuss's species. They are, moreover, rough in surface texture. Karrer draws attention to this, while Reuss ignores the point.

26. **Miliolina venusta** (Karrer).

Quinqueloculina venusta, Karrer, 1868, MFKB, p. 147, pl. ii, fig. 6.
Miliolina venusta, Brady, 1884, FC, p. 162, pl. v, figs. 5, 7.
Miliolina venusta, Flint, 1899, RFA, p. 298, pl. xliv, fig. 2.

Two stations: 53; WS 92.

Single specimens only at these stations.

27. **Miliolina trigonula** (Lamarck).

Miliolites trigonula, Lamarck, 1804, etc., AM, 1804, v, p. 351, no. 3.
Triloculina trigonula, d'Orbigny, 1826, TMC, p. 299, no. 1, pl. xvi, figs. 5–9.
Miliolina trigonula, Brady, 1884, FC, p. 164, pl. iii, figs. 14–16.

Four stations: WS 88, 99, 215, 217.

Rare. There are but few specimens at each station and they occur in two different forms, differing in their length. The long form appears at WS 88 and 217 and the short broad form at WS 99 and 215.

28. **Miliolina tricarinata** (d'Orbigny).

Triloculina tricarinata, d'Orbigny, 1826, TMC, p. 299, no. 7, Modèle no. 94.
Cruciloculina triangularis, d'Orbigny, 1839, FAM, p. 72, pl. ix, figs. 11 and 12.
Triloculina tricarinata, Brady, 1864, RFS, p. 466, pl. xlviii, fig. 3.

Four stations: 388; WS 245, 248, 433.

A few specimens at these stations. D'Orbigny recorded his *Cruciloculina triangularis* (*ut supra*), which has always been regarded as a synonym of *M. tricarinata*, as being fairly common in deep water off the Falkland Islands, on stony ground. None of our Falkland specimens are characterized by the cruciform aperture which gave rise to his generic name, but are normally milioline. In the South Georgia area, however, the cruciloculine aperture is normal and frequent. The Type of *Cruciloculina* was not to be found in Paris.

29. **Miliolina circularis** (Bornemann).

Triloculina circularis, Bornemann, 1855, FSH, p. 349, pl. xix, fig. 4.
Miliolina circularis, Brady, 1884, FC, p. 169, pl. iv, fig. 3; pl. v, figs. 13, 14 (?).

Fifteen stations: 48, 51, 53, 388; WS 71, 79, 83, 87, 88, 90, 93, 94, 95, 108, 213.

The specimens are generally rather small and feeble. Good at 53, 388 and WS 87. A fossil specimen was observed at WS 95.

30. **Miliolina seminuda** (Reuss).

Quinqueloculina seminuda, Reuss, 1866, FABS, p. 125, pl. i, fig. 11.
Miliolina subrotunda, Wright, 1885–6, BLP, p. 319, pl. xxvi, fig. 5.
Miliolina seminuda, Heron-Allen and Earland, 1913, CI, p. 27.

One station: WS 531.

A single weakly marked specimen only.

31. **Miliolina rosea** (d'Orbigny) (Plate VI, figs. 16–18).

Triloculina rosea, d'Orbigny, 1839, FAM, p. 69, pl. iii, figs. 18–20.

One station: WS 93.

A few specimens, white in colour, from this station. In spite of his specific name, d'Orbigny describes his specimens as being uniformly pink *or* white. One specimen shows, by the presence of a few feeble striae on the periphery, the relationship to

M. fichteliana (d'Orbigny) to which d'Orbigny alludes *ut supra*. The Paris Type tube contains three specimens, two entirely covered by efflorescence. The third is a specimen of *M. valvularis*, Reuss, and therefore not in the least resembling d'Orbigny's figure. Evidently a case of "rearrangement". The two effloresced specimens were carefully cleaned, and disclosed the remains of a compressed Miliolid, quite unidentifiable with the figure.

32. **Miliolina lutea** (d'Orbigny) (Plate VI, figs. 19–21).

Triloculina lutea, d'Orbigny, 1839, FAM, p. 70, pl. ix, figs. 6–8.

Two stations: WS 88, 246.

A single specimen at each station agreeing fairly well with d'Orbigny's description and figure. He records it as "rare" from the Falkland Islands sands. The Type is not to be found in Paris. Length, 0·50 mm., greatest breadth, 0·35 mm.

33. **Miliolina rotunda** (d'Orbigny).

Triloculina rotunda, d'Orbigny, 1826, TMC, p. 299, no. 4.
Triloculina rotunda, Schlumberger, 1893, MGM, p. 64, pl. i, figs. 48–50, text-figs. 11, 12.
Miliolina rotunda, Heron-Allen and Earland, 1914, etc., FKA, 1915, p. 568, pl. xlii, figs. 27–30.

Two stations: 388; WS 88.

Many well-developed specimens referable to this species, identical with the Type in Paris.

34. **Miliolina labiosa** (d'Orbigny).

Triloculina labiosa, d'Orbigny, 1839, FC, p. 178, pl. x, figs. 12–14.
Miliolina labiosa, Brady, 1884, FC, p. 170, pl. vi, figs. 3–5.
Triloculina labiosa, Cushman, 1918, etc., FAO, 1929, pt. 6, p. 60, pl. xv, figs. 2, 3.

Two stations: 388; WS 88.

A few small specimens. The Type is missing in Paris.

35. **Miliolina valvularis** (Reuss).

Triloculina valvularis, Reuss, 1851, FSUB, p. 85, pl. vii, fig. 56.
Miliolina valvularis, Brady, 1884, FC, p. 161, pl. iv, figs. 4, 5.
Miliolina valvularis, Goës, 1894, ASF, p. 115, pl. xxii, fig. 871.

Seven stations: 388; WS 71, 83, 84, 86, 88, 221.

Very good specimens. One, very fine and large at WS 84, quite typical. Other good ones at WS 71 and 221.

36. **Miliolina brongniartii** (d'Orbigny).

Triloculina brongniartii, d'Orbigny, 1826, TMC, p. 300, no. 23.
Triloculina brongniartii, Parker and Jones, 1859, etc., NF, 1871, p. 250, pl. viii, fig. 9.
Triloculina brongniartii, Cushman, 1918, etc., FAO, 1929, pt. 6, p. 63, pl. xvi, fig. 4.

Four stations: 388; WS 87, 88, 91.

Very good specimens in excellent condition at 388 and WS 87, 88. No Type-specimen to be found in Paris.

37. **Miliolina suborbicularis** (d'Orbigny).

Triloculina suborbicularis, d'Orbigny, 1826, TMC, p. 300, no. 12.
Triloculina suborbicularis, d'Orbigny, 1839, FC, p. 177, pl. x, figs. 9–11.
Miliolina suborbicularis, Schlumberger, 1893, MGM, p. 72 (in the reprints, p. 215), text-figs. 26–8; pl. ii, figs. 63, 64; pl. iii, fig. 67.

One station: WS 215.

A single specimen of this somewhat unsatisfactorily separated species, being the most fully striate of the *webbiana-fichteliana-suborbicularis* group. (See our observations in H.-A. & E. 1914 etc., FKA, 1915, p. 560.)

The Type of d'Orbigny's *Triloculina suborbicularis* could not be found, but the species is identifiable from his figure, and from Schlumberger's work (*ut supra*). It must not be confounded with d'Orbigny's *Quinqueloculina suborbicularis* (d'O. 1826, TMC, p. 302, no. 29) of which we are only told that it "inhabited the Mediterranean". The name has dropped into disuse, the Types, however, are in good condition in Paris, and fair (though damaged) at La Rochelle. They represent a stout, broad form of *M. seminulum*, the shell being quite free from striae.

Genus **Sigmoilina**, Schlumberger, 1887

38. **Sigmoilina obesa**, sp.n. (Plate VII, figs. 1–4).

Twelve stations: 48, 388; WS 72, 83, 84, 86, 87, 91, 93, 108, 219, 221.

Test free, porcellanous, broadly oval in side view with the aboral end somewhat projecting, elliptical in end view. Two chambers only, visible externally, the final chamber occupying nearly three-quarters of the visible surface, separated by a curved sutural line nearly flush with the surface of the test. The two surfaces are inequilaterally convex and the peripheral edge broadly rounded. Walls thick and devoid of ornament, the surface usually dull, but sometimes polished, though never to the same extent as in *Sigmoilina sigmoidea* (Brady). Aperture, a curved slit furnished with a simple tooth.

Both megalospheric and microspheric forms have been observed, the former as usual being the most abundant. Externally there is no very great difference except in size, the megalospheric form ranging up to 0·80 mm. in length and 0·70 mm. in breadth as compared with 1·45 mm. and 1·20 mm. for the length and breadth of the microspheric. In section, the megalospheric form shows only 2–3 pairs of chambers following the proloculum, while the microspheric has about 7–8 pairs.

Sigmoilina obesa is a fairly distinctive species, its nearest ally is unquestionably *S. sigmoidea* (Brady), but it can hardly be confused with that species externally, while, in section, the sigmoid curves of the two species are quite distinctive.

The species occurs at many stations in the Falkland area, though never in any great numbers.

39. **Sigmoilina schlumbergeri**, Silvestri.

Planispirina celata, Brady, 1884, FC, p. 197, pl. viii, figs. 1–4.
Planispirina celata, Schlumberger, 1887, P, p. 111, text-figs. 6–7; pl. vii, figs. 12–14.

Planispirina celata, Flint, 1899, RFA, p. 303, pl. xlvii, fig. 5.
Sigmoilina schlumbergeri, Silvestri, 1904, TB, p. 267.

Three stations: 236; WS 215, 413.

A few specimens identifiable with Brady's figures ascribed to *Planispirina celata* (Costa). Silvestri has separated these and named them after Schlumberger, who has gone in great detail into the minute structure of the form (*ut supra*). While preserving Silvestri's name *pro tem.*, we may say we have been unable to verify the existence of a microspheric form in *Sigmoilina celata* (Costa), *sensu stricto*. We have cut sections of a considerable number of specimens of both forms and found that *S. schlumbergeri* is, in our experience, invariably microspheric and *S. celata* megalospheric.

40. **Sigmoilina tenuis** (Czjzek).

Quinqueloculina tenuis, Czjzek, 1848, FWB, p. 149, pl. xiii, figs. 31–4.
Spiroloculina tenuis, Brady, 1884, FC, p. 152, pl. x, figs. 7–11.
Sigmoilina tenuis, Schlumberger, 1887, P, p. 118.
Spiroloculina tenuis, Heron-Allen and Earland, 1916, FWS, p. 208 (and *sub M. pygmaea*, p. 211, pl. xxxix, figs. 17–18).

Three stations: WS 217, 221, 408.

Fairly frequent at WS 217 and 408, where the specimens exhibit a great range of form, extending from the typical *Quinqueloculina tenuis*, Czjzek, with its somewhat narrow outline and marked sigmoid curves, to the very complanate *Spiroloculina tenuissima*, Reuss (R. 1867, FSW, p. 71, pl. i, fig. 11), in which the sigmoid curves are hardly recognizable. We have dealt with the relationships of this form with *Miliolina pygmaea* (Reuss) in our West of Scotland paper (*loc. cit.*, p. 211).

Sub-family *HAUERININAE*

Genus **Tubinella**, Rhumbler, 1906

41. **Tubinella funalis** (Brady).

Articulina funalis, Brady, 1884, FC, p. 185, pl. xiii, figs. 6–11.
Tubinella funalis, Rhumbler, 1906, FLC, p. 26.
Tubinella funalis, Cushman, 1918, etc., FAO, 1929, pt. 6, p. 54, pl. xii, fig. 8.

Five stations: 48, 53, 388; WS 71, 88.

A few specimens at each. Three of these stations, 48, 53 and WS 71, are close together in-shore to the north-east of the islands, WS 88 is far away (our furthest south-west station) close to the point of South America and 388 is right off Cape Horn. Its non-occurrence at intermediate stations is difficult to explain, as the species is abundant in Antarctic material, and, if occurring at all, would be expected to be universally distributed in the area.

Genus **Planispirina**, Seguenza, 1880

42. **Planispirina cryptella** (d'Orbigny).

Triloculina cryptella, d'Orbigny, 1839, FAM, p. 70, pl. ix, figs. 4, 5.

Two stations: WS 80, 225.

A single specimen at each station. The Type tube labelled "*T. cryptella*, Îles Malouines" in Paris contains eight specimens, all badly overgrown with efflorescence, some utterly destroyed. One or two were successfully cleaned, and the specimens agree fairly well with d'Orbigny's fig. 5. There is nothing which can be suggested as responsible for fig. 4 which, indeed, cannot be identified with either fig. 5 or the text. The species appears to be very closely related to his *Biloculina irregularis* but is more globular.

As already pointed out by Brady (B. 1884, FC, p. 171) the *Miliola* (*Triloculina*) *cryptella* of Parker and Jones (P. & J. 1865, NAAF, p. 410, pl. xv, fig. 39) is not d'Orbigny's form. This is the only occasion, as far as we are aware, on which d'Orbigny's specific name has been revived.

43. **Planispirina irregularis** (d'Orbigny).

Biloculina irregularis, d'Orbigny, 1839, FAM, p. 67, pl. viii, figs. 20, 21.
Biloculina irregularis, Brady, 1884, FC, p. 140, pl. i, figs. 17, 18.
Biloculina irregularis, Chapman, 1914, EDRS, p. 42, pl. v, fig. 2.

Four stations: WS 76, 225, 245, 248.

Rare. The largest at WS 245, the most typical at WS 76. The Type is not to be found in Paris.

44. **Planispirina sphaera** (d'Orbigny) (Plate VI, figs. 41, 42).

Biloculina sphaera, d'Orbigny, 1839, FAM, p. 66, pl. viii, figs. 13–16.
Biloculina sphaera, Brady, 1884, FC, p. 141 (fig.), pl. ii, fig. 4 *a*, *b*.
Planispirina sphaera, Schlumberger, 1891, BGF, p. 577 (in the reprints, p. 190), text-figs. 45, 46.
Biloculina sphaera, Chapman, 1906, GBI, p. 82, pl. iii, fig. 1 *a*, *b*.

One station: WS 217.

D'Orbigny records this species as not uncommon at the Falkland Islands, but we have found it in but a single dredging, where it is scantily represented, the specimens agreeing absolutely with d'Orbigny's figures, of small size (average 0·50 mm. in diameter), compared with the dimensions which the species attains in deep water round the British Isles, and in Discovery material from higher latitudes than the Falkland Islands. Two Types in the d'Orbigny collection, one very small. They are in good condition and of typical appearance. D'Orbigny's figure, incidentally, is poor.

45. **Planispirina bucculenta** (Brady).

Miliolina bucculenta, Brady, 1884, FC, p. 170, pl. cxiv, fig. 3 *a*, *b*.
Planispirina bucculenta, Schlumberger, 1892, FAM, p. 208 (in the reprints, p. 194), text-figs. 2, 3, pl. viii, figs. 6, 7.
Miliolina bucculenta, Goës, 1894, ASF, p. 118, pl. xxiii, figs. 890–903, pl. xxiv, figs. 904, 905.

One station: WS 88.

A single small specimen at this station; probably a young individual.

Sub-family *PENEROPLIDINAE*

Genus **Cornuspira**, Schultze, 1854

46. **Cornuspira involvens**, Reuss.

Operculina involvens, Reuss, 1849–50, FOT, p. 370, pl. i (xlvi), fig. 20 (not 30).
Cornuspira involvens, Brady, 1884, FC, p. 200, pl. xi, figs. 1–3.

Eight stations: 51, 53, 388; WS 71, 88, 93, 217, 221.

Rare except at WS 88. With the exception of one specimen at WS 88, the whole of the individuals are megalospheric. They are all of a small neat type and there is a great range of size in the megalosphere.

47. **Cornuspira polygyra**, Reuss (Plate VII, fig. 5).

Cornuspira polygyra, Reuss, 1863, KTF, p. 39, pl. i, fig. 1.
Cornuspira polygyra, Reuss, 1870, FSP, p. 463, and Schlicht, 1870, FSP, p. 91, pl. xxxv, figs. 1–4.

Two stations: 388; WS 88.

The specimens are small, ranging up to 0·20 mm. only in diameter, but agree with Reuss's figure and description. They are all megalospheric and some run up to as many as twelve or thirteen convolutions. One or two specimens show a tendency to a slight increase in the diameter of the final convolution, as described by Reuss in his original diagnosis of the species.

48. **Cornuspira selseyensis**, Heron-Allen and Earland.

Cornuspira (?), Earland, 1905, FBS, p. 199, pl. xiii, figs. 2–4.
Cornuspira selseyensis, Heron-Allen and Earland, 1908, etc., SB, 1909, p. 319, pl. xv, figs. 9–11.
Cornuspira selseyensis, Cushman, 1918, etc., FAO, 1929, p. 82, pl. xx, fig. 9.

One station: 53.

At this station a few small individuals were found, rather more regularly coiled than is usually the case.

49. **Cornuspira denticulata**, sp.n. (Plate VII, figs. 6–8).

Three stations: WS 87, 88, 225.

Test discoidal, nearly flat, somewhat depressed at centre, peripheral edge rounded, wall very thin, consisting of a large proloculum followed by 4–6 embracing convolutions of a round tube slowly increasing in diameter. Where the inner edge of the tube overlaps the previous whorl, the shell substance extends over that whorl in minute denticulations. Aperture, an arched opening, over which the outer edge of the tube usually projects forward. Surface smooth and glistening, but showing lines of growth in the form of very faint striae. Colour white to pale straw, translucent. Diameter ranging up to 0·25 mm.

Only a few specimens, all in a good state of preservation, were found at each station, the best being at WS 88 and 225. They were at first regarded with some hesitation, as the denticulate markings and translucent wall were more suggestive of *Spirillina* than of *Cornuspira*. In fact the specimens bear some resemblance in their markings to the form

figured by Sidebottom (1904, etc. RFD, 1908, p. 7, pl. ii, fig. 2) as *Spirillina vivipara* var., or to Williamson's figure of *Spirillina margaritifera*. Careful examination of specimens in balsam under high powers failed, however, to give any evidence of perforations, and their pale amber colour in that medium seems conclusive evidence of the porcellanous nature of the shell.

50. **Cornuspira foliacea** (Philippi).

Orbis foliaceus, Philippi, 1844, EMS, p. 147, pl. xxiv, fig. 25 (error for 26).
Spirillina foliacea, Williamson, 1858, RFGB, p. 91, pl. vii, figs. 199–201.
Cornuspira foliacea, Brady, 1884, FC, p. 199, pl. xi, figs. 5–9.

One station: WS 531.

A single broken specimen, only, represents this very widely spread species in our material.

Genus **Opthalmidium**, Zwingli and Kübler, 1870

51. **Opthalmidium inconstans**, Brady.

Hauerina inconstans, Brady, 1879, RRC, p. 268.
Opthalmidium inconstans, Brady, 1884, FC, p. 189, pl. xii, figs. 5, 7, 8.
Opthalmidium inconstans, Flint, 1899, RFA, p. 302, pl. xlvii, fig. 3.

Two stations: WS 93, 245.

Single small individuals at each station. The occurrence of only single specimens of this widely distributed species is noteworthy.

Family ASTRORHIZIDAE

Sub-family *ASTRORHIZINAE*

Genus **Iridia**, Heron-Allen and Earland, 1914

52. **Iridia diaphana**, Heron-Allen and Earland.

Iridia diaphana, Heron-Allen and Earland, 1914, etc., FKA, 1914, p. 371, pl. xxxvi, 1915, p. 607.
Iridia diaphana, Heron-Allen and Earland, 1916, FSC, p. 37.
Iridia diaphana, Heron-Allen and Earland, 1930, FPD, p. 65, pl. iii, figs. 32, 33.

One station: WS 246.

Only a single specimen, attached to a Polyzoan fragment, which can be identified with practical certainty.

Genus **Storthosphaera**, F. E. Schulze, 1875

53. **Storthosphaera depressa**, Pearcey.

Storthosphaera depressa, Pearcey, 1900, RCA, p. 37, pl. i, fig. 1.
Storthosphaera depressa, Heron-Allen and Earland, 1922, TN, p. 231.

One station: WS 217.

Two specimens utilizing spicules more largely in their construction than is usual in British specimens. Like *Dendrophrya erecta* (*post* no. 58), it is probably widely distributed, but has only been recorded from Britain up to the present.

Genus Crithionina, Goës, 1894

54. **Crithionina granum, Goës.**

Crithionina granum, Goës, 1894, ASF, p. 15, pl. iii, figs. 28–33.
Crithionina granum, Rhumbler, 1903, ZRR, p. 231, fig. 58.
Crithionina granum, Cushman, 1918, etc., FAO, 1918, p. 69, pl. xxvi, figs. 6–7.

Three stations: WS 99, 109, 217.

The specimens are few but quite characteristic. Some of them show signs of having been attached, and others, from their irregular shape, probably lived in interstices between sand grains.

55. **Crithionina mamilla, Goës.**

Crithionina mamilla, Goës, 1894, ASF, p. 15, pl. iii, figs. 34–6.
Crithionina mamilla, Heron-Allen and Earland, 1912, etc., NSG, 1913, p. 9, pl. iii.

Three stations: 53; WS 225, 245.

The specimens are few and poorly developed, the best at WS 245, attached to a pebble and bristling with long sponge spicules. A similar spiculiferous specimen, but detached, at WS 225.

56. **Crithionina pisum, Goës.**

Crithionina pisum, Goës, 1896, DOA, p. 24, pl. ii, figs. 1, 2.
Crithionina pisum, Heron-Allen and Earland, 1909, TNS, p. 410, pl. xxxiv, fig. 6 *a*.

One station: 53.

Rare and very small but quite spherical.

Genus Saccorhiza, Eimer and Fickert, 1899

56 A. **Saccorhiza ramosa (Brady).**

Hyperammina ramosa, Brady, 1879, etc., RRC, 1879, p. 33, pl. iii, figs. 14, 15; 1884, FC, p. 261, pl. xxiii, figs. 15–19.
Saccorhiza ramosa, Eimer and Fickert, 1899, AVF, p. 670.

One station: WS 433.

A few fragments.

Genus Dendrophrya, Strethill Wright, 1861

57. **Dendrophrya radiata, Strethill Wright.**

Dendrophrya radiata, Strethill Wright, 1861, *Ann. Mag. Nat. Hist.* (3), VIII, p. 122.
Dendrophrya radiata, Brady, 1884, FC, p. 238, pl. xxvii *a*, figs. 10–12.

One station: WS 210.

A few rather doubtful specimens attached to zoophyte fragments were found at this station to the north of the Falkland Islands, in 161 m. They are not sufficiently well preserved to be identified with certainty.

58. **Dendrophrya erecta**, Strethill Wright (Plate VII, fig. 9).

Dendrophrya erecta, Strethill Wright, 1861, *Ann. Mag. Nat. Hist.* (3), VIII, p. 122, pl. iv, figs. 4, 5.
Dendrophrya erecta, Brady, 1884, FC, p. 239, pl. xxvii *a*, figs. 7–9.

One station: WS 221.

A single excellent specimen attached to a *Pecten* shell. It is quite possible that the species is widely distributed, but hitherto the only records are from shallow water round the British coasts.

Genus **Dendronina**, Heron-Allen and Earland, 1922

59. **Dendronina papillata** (Heron-Allen and Earland) (Plate XVI, figs. 33–38 and Plate XVII, figs. 1–3).

Diffusilina papillata, Heron-Allen and Earland, 1929, etc., FSA, 1929, p. 324, pl. i, figs. 4–6.

Six stations: WS 213, 221, 225, 242, 243, 245.

"Test attached to stones and other objects, generally roughly circular in outline, though the edges are frequently produced into irregular cusps. In form, more or less convex, built up of finely comminuted sand and mud, firmly compacted but without much cement, except in the outer layer which is very smooth, even polished, but with one or more well-marked, projecting papillae, formed of the same minute sand grains more loosely agglutinated. These papillae presumably form the avenues for the extrusion of the protoplasm, which, however, may perhaps also find an exit round the edges of the test, although these appear to be in close contact with the surface of attachment. Colour varying from dirty white to grey.

"Specimens broken open reveal a simple cavity with lobular extensions—in fact amoeboid in shape—filled with pale brown protoplasm. Larger sand grains are used in the construction of the interior, than of the outer layer of the wall. No passages connecting the central cavity with the papillae or the edges can be made out. Probably the protoplasm exudes in a fluid form between the sand grains, and digestion is carried on outside the test. The size varies up to about 2 mm. in diameter."

The foregoing extract from the original description of the species still holds good on the whole, but a much larger supply of material has demonstrated that the specimens originally described were young individuals constituting the first stage of a larger organism which can no longer be retained in the genus *Diffusilina*, but must be removed to *Dendronina*, a genus originally described by us from New Zealand and the Ross Sea in the Antarctic (H.-A. & E. 1922, TN, p. 78 *et seq.*). It was then suggested that the genus might prove to have a wide distribution.

Following on the early growth described above, the second stage consists in the prolongation of the central nipple into a short, stout, tubular outgrowth, furnished at its extremity with a constricted circular opening. The same fine material is employed. The walls of the tube are thin and the central cavity large, and the tube is apparently superimposed on the original papilla, forming a separate chamber of which the top of the papilla forms the base. Its height may be 2·00 mm. or more.

In the third and final stage the tube expands and forms an irregular body, either

bulbous or club-shaped, or irregularly branching, with terminal apertures. In this final stage the wall is reduced to almost papery thinness and is very fragile. No perfect specimens in this stage have been found, nor does it seem probable that they would survive the treatment of cleaning the material. A sufficient number of fragments representing the final stage, ranging up to 2·00 mm. in length, associated with specimens of the second stage with fractured terminal tube was, however, found at WS 225 to justify the foregoing reconstruction of the third or final stage of growth. The height of the complete organism is probably 4–5 mm. Perfect specimens may yet perhaps be found in sheltered crevices of sponges, etc.

One or two specimens have been seen with two diverging tubes on the same basal "pad", but these appear to be abnormal. The shape of the basal pad varies according to its *locus adhaerendi*. On stones and shells it is invariably circular and very depressed, but when the organism has started growth on the stem of a zoophyte, the pad increases in size conformably with the surface of attachment and becomes elongated and more rapidly conical. Such specimens were found at WS 225, but were very uncommon. Intermediate forms of the basal pad also occur.

In one very interesting specimen which we figure, the basal pad had probably been attached to some soft organism which had decayed. The branching passages of the earliest chamber are clearly seen through a thin chitinous film, which covers the base of the pad, and leaves no doubt as to the astrorhizid character of the organism. It measures 1·20 mm. in diameter.

Dendronina papillata is evidently very closely related to *Dendronina limosa* var. *humilis* (H.-A. & E. 1922, TN, p. 81, pl. ii, figs. 7–9), but differs from it in the spreading character of the basal pad, and by an invariably sessile habit.

The species is not uncommon at WS 225 and 242, less frequent at the other stations.

The removal of this species from the genus *Diffusilina* does not affect our original diagnosis of that genus and its genotype *D. humilis*.

Sub-family *SACCAMMININAE*

Genus **Psammosphaera**, F. E. Schulze, 1875

60. **Psammosphaera fusca**, Schulze (Plate VIII, figs. 1–4 and Plate XVII, figs. 4–6).

Psammosphaera fusca, Schulze, 1874–5, R, p. 113, pl. ii, fig. 8.
Psammosphaera fusca, Brady, 1884, FC, p. 249, pl. xviii, figs. 1–8.
Psammosphaera fusca, Heron-Allen and Earland, 1912, etc., NSG, 1913, p. 1, pls. i–iii.

Twenty-nine stations: 230, 388; WS 71, 73, 76, 77, 78, 79, 80, 83, 84, 87, 88, 90, 91, 92, 93, 94, 108, 109, 210, 215, 217, 221, 225, 246, 248, 431, 433.

The species is generally distributed and often common, and it presents an unusual amount of variation. What may be described as the normally spherical and regularly constructed type occurs at 230 and WS 71, 80, 92, 109. A similar form, but neatly constructed almost entirely of coarse sand grains occurs at WS 225. Fine material only is employed for a nearly spherical form at WS 84. At WS 210, the species was represented

by a single tiny almost spherical specimen. At WS 73, shell fragments are used producing a highly irregular test.

More characteristic of the Falkland area are the very roughly and irregularly formed specimens which are found at WS 76, 77, 79, 83, 84, 108, 215, 217, 221 and 248. These present a most extraordinary dissimilarity, but they all agree in the use of a very limited number of large sand and mineral grains agglomerated by cement, with a central cavity at their points of juncture, the body of the animal thus forming a very minute fraction of the bulk of the organism. Specimens thus incorporating four large sand grains are common, they have been seen with as few as three, or even two grains constituting the "house" (Plate VIII, figs. 31–3). In this last stage they approach very closely to the sessile forms which are found at WS 79, 87, 88, 225, 246; these occur both as finely and coarsely constructed forms; at WS 88 both coarse and fine forms occur together.

Genus **Proteonina**, Williamson, 1858

61. **Proteonina difflugiformis** (Brady).

Reophax difflugiformis, Brady, 1879, etc., RRC, 1879, p. 51, pl. iv, fig. 3; 1884, FC, p. 289, pl. xxx, figs. 1–5.
Proteonina difflugiformis, Rhumbler, 1903, ZRR, p. 245, figs. 80 *a*, *b*.

Ten stations: 228; WS 76, 77, 90, 99, 108, 210, 215, 217, 433.

Not very abundant, the largest and most typical at WS 90, most frequent at WS 433. Very neatly constructed, with much cement at WS 99; very rough and irregular at 228 and WS 217.

Genus **Thurammina**, Brady, 1879

61 A. **Thurammina castanea**, Heron-Allen and Earland.

Thurammina papillata, Brady, 1879, etc., RRC, 1879, p. 45, pl. v, figs. 4–8; 1884, FC, p. 321, pl. xxxvi, figs. 7–18.
Thurammina papillata var. *castanea*, Heron-Allen and Earland, 1912, etc. NSG, 1917, p. 545, pl. xxvi, figs. 14–18; pl. xxix, fig. 17.

One station: 388.

A single small specimen, so pauperate that the test is more or less collapsed.

Genus **Technitella**, Norman, 1878

62. **Technitella nitida**, sp.n. (Plate XVI, fig. 39).

One station: WS 531.

Test, monothalamous, an elongate oval, broadest below the middle, and narrowing towards the oral end, where there is a large simple aperture surrounded by a slightly thickened and everted lip. In section, roughly circular, but the surface of the dried test has one or two longitudinal depressions probably due to shrinkage. Constructed of fine acerate sponge spicules, mostly unbroken, neatly cemented together with a white cement, in a single layer, so that the spicules lie regularly parallel to the long axis of the

test. Surface smooth and without any projecting spicules. Colour, glistening white. Length 1·50 mm.; greatest breadth 0·80 mm.

This very interesting little form, of which only a single perfect specimen was obtained, appears to occupy a position intermediate between *T. legumen* Norman and *T. melo* Norman. It differs from *T. legumen* in its regularly oval form, and particularly in the absence of that inner layer of sponge spicules set at right angles to the outer layer which marks the high selective and constructional powers of that species,[1] while agreeing with that species in its superficial neatness and the longitudinal arrangement of the spicules in the external wall. It resembles *T. melo* in its general form and in the construction of its test in a single layer, but differs from that species in its extraordinary neatness. In *T. melo* the aboral end of the shell bristles with the projecting ends of the spicules, but in our species the aboral end is as neatly finished as the rest of the shell.

Genus **Webbinella**, Rhumbler, 1903

63. **Webbinella hemisphaerica** (Jones, Parker and Brady) (Plate VIII, fig. 9).

Webbina hemisphaerica, Jones, Parker and Brady, 1866, etc., MFC, 1866, p. 27, pl. iv, fig. 5.
Webbina hemisphaerica, Brady, 1884, FC, p. 350, pl. xli, fig. 11.
Webbinella hemisphaerica, Rhumbler, 1903, ZRR, p. 228, fig. 54.

Two stations: WS 221, 246.

A single specimen at each station of the original type, characterized by a high-domed, practically semi-globular test without any marginal extension. The specimen from WS 221 is snow white, that from WS 246 of the more usual dark, ferruginous colour. They differ greatly in appearance from the depressed, outspreading type which has sometimes been figured under this name and which we are now separating, being convinced of the absence of any relationship.

64. **Webbinella depressa**, sp.n. (Plate VII, figs. 10, 11).

Webbinella hemisphaerica, Cushman, 1910, etc., FNP, 1910, p. 51, fig. 56; 1918, etc., FAO, 1918, p. 62, pl. xxv, figs. 1–3; 1922, FHB, p. 6.

Five stations: WS 93, 221, 225, 245, 246.

Test sessile, very slightly convex, flattening towards the periphery which is usually more or less irregular in outline, and rarely circular as in *W. hemisphaerica*. Constructed of very fine sand grains without visible cement and rather thick walled, the central cavity being quite small. Exterior very smooth and neatly finished; colour varying from nearly white to dark grey, never ferruginous; no visible aperture. Size very variable, ranging from 1·0 up to 3·0 mm. in diameter.

Common on shell fragments at WS 246, more rarely at the other stations recorded, and probably widely distributed in the Falkland area, wherever conditions are suitable. Cushman (*supra*, 1922, FHB) records what is evidently the same form from shallow water in Hudson's Bay under the name *W. hemisphaerica*, but he draws attention to the many points of difference, and evidently regarded his specimens as a distinct organism.

[1] H.-A. & E. 1912, etc., NSG, 1912, pp. 382–3, pl. v, fig. 1, 2; pl. vi, fig. 1.

W. depressa is readily distinguished from *W. hemisphaerica* by (1) its low convexity, (2) its irregular contour, and (3) by the invariable absence of ferruginous cement. The minute sand grains, though firmly agglomerated, are not cemented together, and the test can be opened with a needle point without fracture, an impossibility with the firmly cemented hemisphere of *W. hemisphaerica*.

Genus **Tholosina**, Rhumbler, 1895

65. **Tholosina bulla** (Brady).

Placopsilina bulla, Brady, 1879, etc., RRC, 1881, p. 51; 1884, FC, p. 315, pl. xxxv, figs. 16, 17.
Tholosina bulla, Cushman, 1910, etc., FNP, 1910, p. 49, fig. 55.

Five stations: WS 213, 215, 225, 246, 433.

The semi-globular type of Brady is a deep-water organism, as evidenced by the shape of the test. No very typical examples occur, the best being at WS 246.

66. **Tholosina protea**, sp.n. (Plate VIII, figs. 5-8).

Five stations: WS 94, 213, 225, 243, 246.

Test normally adherent, sometimes becoming detached and assuming the free condition, consisting of a single thick-walled chamber composed of very fine sand and mud firmly agglutinated with cement; surface usually smooth but not polished; aperture one or more small holes situated at the extremities; shape protean, dependent upon the nature of the surface of attachment. Colour varying from snowy white, which is not uncommon, to nearly black, according to the material employed. Dimensions very variable, ranging up to 2·0 mm., but on an average about 1·0 mm. in greatest diameter.

We have given this name to an organism with which we have long been familiar in dredged material from our own coasts. The Falklands specimens show little difference except in their greater size and abundance.

It may be regarded as the shallow-water equivalent of the deep sea *T. bulla*. In shape it is truly protean, the form of the "house" being governed by the contour of the surface on which it is built. On flat surfaces it is semi-globular, sometimes nearly globular, with difficulty separable from *T. bulla*. When attached to the stalk of a zoophyte its length may be many times its breadth, and separate individuals are sometimes so closely situated as to give the impression of a multilocular organism. It is possible that the doubtful organism *Placopsilina kingsleyi*, Siddall (S. 1886, LMBC, p. 54, pl. i, fig. 1) may have been such a double specimen. The description and figure are poor, and the Type is missing from the Siddall collection now in our possession. A favourite position is in the forking angle of a branching zoophyte, where it becomes attached to both branches and forms a wedge-shaped and irregular "house". It sometimes surrounds a slender branch. Finally, it may become detached and continue a free existence as a more or less rounded object, usually showing traces of its original point of attachment.

It is probably abundant where conditions are favourable. Not much of our material was of a suitable nature, but it was common and varied at WS 243.

67. **Tholosina vesicularis** (Brady).

Placopsilina vesicularis, Brady, 1879, etc., RRC, 1879, p. 51, pl. v, fig. 2; 1884, FC, p. 316, pl. xxxv, figs. 18, 19.
Tholosina vesicularis, Rhumbler, 1903, ZRR, p. 227, fig. 53.

Seven stations: 235; WS 76, 77, 213, 215, 225, 243.

Probably generally distributed wherever conditions are suitable. It often occurs in enormous numbers, particularly at WS 225 and 243, where it encrusts the stones.

68. **Tholosina vesicularis** var. **erecta**, Heron-Allen and Earland (Plate XVII, figs. 7, 8)

Tholosina vesicularis var. *erecta*, Heron-Allen and Earland, 1929, etc., FSA, 1929, p. 325, pl. i, figs. 7, 8.

Six stations: WS 77, 213, 221, 225, 242, 243.

The characters of the variety are the same as those given by Brady for the species, but the tubular extensions, instead of being attached to the surface of the stone, are free and project above the organism like factory chimneys. Occasionally the tubes fork, a feature which Brady mentions in connection with the type, but which is, in our experience, very rarely seen.

The variety favours depressions and cavities in stones, and is accordingly less convex than the type. In many specimens it forms merely a flat arenaceous membrane enclosing a cavity and surrounded by vertical tubes as shown in fig. 8. The size is variable, but specimens have been seen up to 4 mm. in diameter.

T. vesicularis is abundant and widely distributed in the Falkland area, but the variety *erecta* has so far only been observed at those stations where the presence of many decomposing rock fragments favoured its growth. Probably it occurs in other suitable localities, as fragments of similar tubes have been observed at many stations which, until the discovery of the entire organism, were regarded as fragments of *Psammatodendron*, Norman.

Sub-family *RHABDAMMININAE*

Genus **Jaculella**, Brady, 1879

69. **Jaculella acuta**, Brady.

Jaculella acuta, Brady, 1879, etc., RRC, p. 35, pl. iii, figs. 12, 13; 1884, FC, p. 255, pl. xxii, figs. 14–18.

Two stations: WS 99, 217.

Single specimens.

70. **Jaculella obtusa**, Brady.

Jaculella obtusa, Brady, 1882, FKE, p. 714; 1884, FC, p. 256, pl. xxii, figs. 19–22.
Jaculella obtusa, Goës, 1894, ASF, p. 20, pl. iv, figs. 87–9; pl. v, figs. 90, 91.

Two stations: WS 217, 219.

A number of coarsely arenaceous specimens at WS 219, and one entirely constructed of spicules at WS 217.

Genus **Hyperammina**, Brady, 1878

71. **Hyperammina friabilis**, Brady.

Hyperammina elongata (*pars*), Brady, 1878, RRNP, p. 433; 1879, etc., RRC, 1879, p. 32.
Hyperammina friabilis, Brady, 1884, FC, p. 258, pl. xxiii, figs. 1–3, 5, 6.

Seven stations: WS 76, 80, 99, 109, 225, 229, 408.

With the exception of single very large specimens at WS 80 and WS 229, the specimens are very small. Most common at WS 109, but the best individuals at WS 80 and 408.

72. **Hyperammina elongata**, Brady.

Hyperammina elongata (*pars*), Brady, 1878, RRNP, p. 433, pl. xx, figs. 2 *a*, *b*; 1884, FC, p. 257, pl. xxiii, figs. 4, 7–10.
Hyperammina elongata, Balkwill and Wright, 1885, DIS, p. 328, pl. xiii, fig. 4.

Two stations: WS 215, 225.

A good many fragments and a few perfect specimens at WS 225. They resemble the specimens figured by Balkwill and Wright (*ut supra*) in their somewhat roughly and loosely agglutinated tests.

73. **Hyperammina laevigata**, Wright.

Hyperammina elongata var. *laevigata*, Wright, 1891, SWI, p. 466, pl. xx, fig. 1.
Hyperammina elongata var. *laevigata*, Cushman, 1910, etc., FNP, 1910, p. 61, fig. 75.
Hyperammina laevigata, Cushman, 1918, etc., FAO, 1918, p. 77, pl. xxix, fig. 5, 6.
Hyperammina elongata var. *laevigata*, Heron-Allen and Earland, 1922, TN, p. 88.

Three stations: WS 215, 408, 433.

A perfect specimen at WS 408 and fragments at the other stations.

74. **Hyperammina clavigera**, sp.n. (Plate VII, figs. 12–15).

One station: WS 246.

The test is very neatly constructed, principally of broken sponge spicules, occasionally including a few large sand grains or mineral flakes, and is firmly consolidated with little visible cement. It commences with a swollen proloculum which, owing to the rigid nature of the material employed, is often very irregular in shape and dimensions. The proloculum tapers gradually into a long narrow tube of uniform diameter composed of the same materials. The spicules are arranged either longitudinally or spirally. In the latter case the spiral arrangement tends to produce a curved tube, which in extreme instances may itself exhibit a distinct spiral twist.

Length of largest specimen found with proloculum, 3·40 mm. Diameter of tube ranges between 0·10 and 0·15 mm. Diameter of proloculum ranges between 0·25 and 0·40 mm.

Larger fragments without a proloculum have been found, but in its absence cannot be distinguished with certainty from *Marsipella cylindrica*, Brady.

The nearest relative of *H. clavigera* is possibly *H. laevigata*, Wright, to which it bears

a general resemblance in size and in the fusiform shape of the proloculum. It is possible that our Falkland form represents merely a variety of *H. laevigata* possessing selective powers.

The only organism with which we are acquainted in any way resembling *H. clavigera* is *H. calcilega*, Rhumbler (1906, FLC, p. 24, pl. ii, figs. 1, 2—*Saccorhiza calcilega* (Rhumbler), C. 1910, etc., FNP, 1910, p. 66, figs. after Rhumbler) from Laysan in the Pacific Ocean. Rhumbler's species, however, has a bulbous proloculum and the tube coated with projecting sponge spicules, thereby indicating its affinity with *H. ramosa*, Brady. It differs much in appearance from the neatly finished Falkland species.

75. **Hyperammina novae-zealandiae**, Heron-Allen and Earland (Plate VIII, figs. 10, 11).

Technitella mestayeri, Cushman, 1919, RFNZ, p. 595, pl. 74, fig. 4.
Hyperammina novae-zealandiae, Heron-Allen and Earland, 1922, TN, p. 89, pl. iii, figs. 1–5.

Two stations: WS 225, 246.

At WS 225 which is on the Continental Shelf to the north-west of the Falkland Islands and at WS 246, which is just off the Continental Shelf to the south, a number of specimens, mostly broken, were obtained of this interesting form. Among the fragments, both megalo- and microspheric forms occur, and the shell structure is characterized by the same selective powers as described by us *ut supra*. The test is almost entirely constructed of spicules in a double layer. The Falkland specimens must have been very much larger than those from New Zealand, as several fragments of the microspheric form attain the maximum size observed there, and one fragment is over 10 mm in length. The absence of the species from the other gatherings is rather noteworthy.

76. **Hyperammina malovensis**, sp.n. (Plate VIII, figs. 12–14).

One station: WS 88.

Test consisting of a slightly curved unseptate tube, with thin walls neatly built of very fine grey sand, in which much larger mineral grains are incorporated irregularly, but so as to preserve the smooth exterior of the tube. The walls being so thin, these larger sand grains project into the interior of the tube which is rough and irregular. The diameter of the test is fairly uniform throughout, but occasional specimens exhibit a tendency to form a bulbous swelling at about mid-length. The proloculum is not swollen, the initial end of the tube and sometimes both ends being closed with a "stopper" of material similar to that used for the walls. Colour dark grey-brown. Length unknown, the largest fragment 6 mm.

A good many fragments, but no perfect specimens, were found at WS 88. The organism is distinctive and its exact relationships are rather puzzling. The bulbous swelling in the tube would suggest *Rhabdammina linearis*, Brady, but the closed end of the tube forbids its inclusion in that genus. On the other hand it has few points in common with *Hyperammina* except this closed tube. The general texture of the wall and the nature of the proloculum make *H. elongata*, Brady, its nearest relative.

Genus **Psammatodendron**, Norman, 1881

77. **Psammatodendron indivisum**, sp.n. (Plate VII, fig. 16).

Three stations: WS 92, 213 (fragments ?), 243.

Test consists of a long, unbranching, very narrow thin-walled tube emerging from a rather large depressed circular primordial chamber. The tube increases slightly in diameter in the course of its growth and is composed of extremely minute sand grains mixed with cement, pale brown in colour, flexible in life, rather brittle in dried specimens. Aperture simple at the termination of the tube, which is here apparently somewhat constricted. Average length of tube 1·50 mm. Average diameter of primordial base 0·25 mm.

A few examples only of this little organism have been found attached to stones, etc. It is probably not uncommon, if specially searched for, but is not easily detected among other sessile organisms.

P. indivisum differs from the genotype *P. arborescens* (B. 1881, HNPE, p. 98) in its unbranching habit and large depressed primordial chamber. It might perhaps be assumed that the unbranching specimens found were merely young individuals of *P. arborescens*, but in that case it would be expected that plentiful fragments of the branching colonies would be found in the dredged material. This is not the case, nothing suggesting a branched fragment of *P. arborescens* has been seen. The depressed shape of the primordial chamber of *P. indivisum* is also very characteristic. Brady figures that of *P. arborescens* as a bulb, and describes it as a "more or less inflated chamber". From the many examples in our gatherings at Millport, we can say that the primordial chamber of *P. arborescens* is extremely difficult to find at all. The organism usually starts abruptly with a tubular outgrowth from its surface of attachment.

Genus **Marsipella**, Norman, 1878

78. **Marsipella cylindrica**, Brady.

Marsipella cylindrica, Brady, 1882, FKE, p. 714; 1884, FC, p. 265, pl. xxiv, figs. 20–22.
Marsipella cylindrica, Heron-Allen and Earland, 1912, etc., NSG, 1912, p. 388, pl. v, figs. 8, 9; pl. vi, figs. 8, 9.

Three stations: 228; WS 99, 215.

Fragments only. At WS 99 they are larger than usual and built up of sand grains and sponge spicules, whole and broken, irregularly arranged. At 228 the specimens are smaller and almost entirely constructed of spicules neatly cemented together.

Genus **Rhabdammina**, M. Sars, 1869

79. **Rhabdammina abyssorum**, M. Sars.

Rhabdammina abyssorum, M. Sars, 1868, LUHD, p. 248; G. O. Sars, 1871, HF, p. 251.
Rhabdammina abyssorum, Brady, 1884, FC, p. 266, pl. xxi, figs. 1–13.

One station: WS 225.

A single three-rayed specimen, more neatly constructed than is usually the case with the North Sea type, the sand grains being small and almost uniform in size.

80. **Rhabdammina discreta**, Brady.

Rhabdopleura sp. Dawson, 1870–1, G. St L., p. 177, text-fig. 7.
Rhabdammina discreta, Brady, 1879, etc., RRC, 1881, p. 48; 1884, FC, p. 268, pl. xxii, figs. 7–10.
Rhabdammina discreta, Cushman, 1918, etc., FAO, 1918, p. 21, pl. xi, fig. 1.

One station: WS 225.

Not uncommon, the specimens rather small. Fragments, probably referable to this species but not in a condition to be determined with certainty, occur at WS 96 and 210.

Genus **Protobotellina**, Heron-Allen and Earland, 1929

81. **Protobotellina cylindrica**, Heron-Allen and Earland (Plate XVII, figs. 9–13).

Protobotellina cylindrica, Heron-Allen and Earland, 1929, etc., FSA, 1929, p. 326, pl. ii, figs. 9–13.

Eight stations: WS 77, 80, 109, 213, 215, 229, 231, 243.

Test large, irregularly cylindrical, in the form of an unseptate tube with walls of even thickness, open at one extremity, closed at the other. Colour, dark grey to pale brown. The aboral extremity is abruptly truncated and exhibits no sign of a bulbous proloculum either externally or in section. The oral extremity is generally rounded off, but sometimes rather flattened and outspreading, and is furnished with a round or oval constricted aperture, which is reduced in size or defended by spicules, or larger sand grains projecting from the inner wall.

The wall is thick and built of fine sand grains and broken sponge spicules firmly agglutinated, but with little visible cement. The proportions of sand and spicules vary greatly; in some specimens the spicules predominate. The external surface is smooth and neatly finished. Feeble constrictions and swellings, visible externally, give an impression of internal septa which do not in fact exist. The central tube is unseptate and approximately of the same diameter throughout. Sections occasionally show a constriction of the inner tube due to a thickening of the wall, but these cannot be regarded as primitive or degenerate septa, nor do they coincide with the constrictions of the outer wall. In diameter the tube is about equal to the thickness of its surrounding wall.

The inner surface of the tube is extremely rough, owing to the projection of spicules and sand grains larger than those employed in the construction of the outer wall. These spicules and sand grains frequently project almost to the middle of the tube, but never across it, nor do they form a labyrinthic structure in the tube, as in *Botellina labyrinthica*. The entire tube is filled with a homogeneous mass of protoplasm, nearly black in colour.

The spicules and sand grains projecting from the inner wall are presumably so placed to exclude parasitic worms. These are a source of trouble to most large Foraminifera, and many devices are employed for their exclusion. That it is not entirely effective is proved by our finding a Sipunculid inside a large specimen. Whether such organisms resort to the tubes for food, or for shelter only we cannot say. They are not tube builders.

Externally *Protobotellina* bears considerable superficial resemblance to *Botellina labyrinthica*, Brady, but a close examination reveals generic differences. The fine sand and spicules, although firmly built into the wall of *Protobotellina*, can be scraped away

with a scalpel, and sections can be ground with little trouble. In *Botellina* the grains are larger and so firmly cemented together as to resist dislodgment without fracture, and sections are very hard to grind. Moreover, *Botellina*, on the rare occasions when it has been found perfect, exhibits a bulbous proloculum in strong contrast with *Protobotellina*, in which there is no increase in the diameter of the tube at the initial extremity. Sections of the two organisms exhibit a strong contrast between the projecting spicules of *Protobotellina* and the firmly built outgrowths which fill the tube of *Botellina* with a labyrinthine core.

The affinities of *Protobotellina* are not very evident. While placing it at present near *Botellina* on account of general resemblances and its primitive labyrinthic interior, we are not convinced that it lies in any direct relationship to that genus. The friable nature of the shell wall would suggest a connection with *Hyperammina* but for the absence of a bulbous proloculum, which is even more characteristic of that genus than of *Botellina*.

P. cylindrica is widely distributed over the sandy area between the Falkland Islands and the coast of South America, but is probably never very abundant. We have perfect specimens from a number of stations, depths ranging between 150 and 300 m., and fragments from others. The size varies greatly at different stations, but on the whole averages about 25 mm. in length and 4 mm. in diameter. A specimen from station WS 243 was over 2½ in. long, and fragments have been seen which suggest even larger dimensions.

The finding of living specimens with other Foraminifera and Polyzoa attached to the basal end indicates that the organism lies flat on the surface of the sandy bottom, and does not assume an erect position or attach itself basally to other objects.

Genus **Botellina**, Carpenter, 1869

81 A. **Botellina labyrinthica**, Brady.

Botellina sp. Carpenter, 1869, *Proc. Roy. Soc.* XVIII, p. 444; 1870, *Cat. of Objects, R.M.S.* p. 4, no. 3.
Botellina labyrinthica, Brady, 1879, etc., RRC, 1881, p. 48; 1884, FC, p. 279, pl. xxix, figs. 8–18.
Botellina labyrinthica, Cushman, 1918, etc., FAO, 1920, p. 88, pl. xviii, figs. 1–4.

One station: 388.

All the specimens are fragmentary and of the small thin-walled form found in shallow water, British dredgings.

Family LITUOLIDAE

Sub-family *LITUOLINAE*

Genus **Reophax**, Montfort, 1808

82. **Reophax scorpiurus**, Montfort.

Reophax scorpiurus, Montfort, 1808–10, CS, 1, p. 330, 83e genre.
Reophax scorpiurus, Brady, 1884, FC, p. 291, pl. xxx, figs. 12–17.

Twenty-two stations: 236; WS 73, 76, 86, 91, 92, 93, 97, 98, 99, 109, 210, 215, 217, 219, 225, 230, 235, 245, 248, 408, 433.

Almost universally distributed. The largest and most typical specimens at WS 97, 225 and 235. Very irregularly formed specimens at WS 76; long and narrow forms at WS 99 and 109. At WS 86, the specimens approach *R. pilulifera* in the globosity of the final chambers. The tests are nearly always constructed of angular quartz grains, but at WS 245, a black mineral is partially employed, giving a very distinctive appearance to the test.

82 A. **Reophax pilulifera**, Brady.

Reophax pilulifera, Brady, 1884, FC, p. 292, pl. xxx, figs. 18–20.
Reophax pilulifera, Brady, Parker and Jones, 1888, AB, p. 217, pl. xli, figs. 5–8.
Reophax pilulifer, Cushman, 1910, etc., FNP, 1910, p. 85, figs. 112–18.

One station: WS 433.

A few good specimens.

83. **Reophax fusiformis** (Williamson).

Proteonina fusiformis, Williamson, 1858, RFGB, p. 1, pl. i, fig. 1.
Reophax fusiformis, Brady, 1884, FC, p. 290, pl. xxx, figs. 7–11.
Reophax fusiformis, Millett, 1898, etc., FM, 1899, p. 253, pl. iv, fig. 11.

Four stations: 228; WS 92, 99, 408.

Rare. The specimens are small, the best being at 228 and WS 408.

84. **Reophax dentaliniformis**, Brady.

Reophax dentaliniformis, Brady, 1879, etc., RRC, 1881, p. 49; 1884, FC, p. 293, pl. xxx, figs. 21, 22.
Reophax dentaliniformis, Cushman, 1910, etc., FNP, 1910, p. 87, fig. 121.

One station: 228.

A single specimen, as usual employing sponge spicules largely in the construction of its test.

84 A. **Reophax nodulosa**, Brady.

Reophax nodulosa, Brady, 1879, etc., RRC, 1879, p. 52, pl. iv, figs. 7–8; 1884, FC, p. 294, pl. xxxi, figs. 1–9.
Reophax nodulosa, Cushman, 1910, etc., FNP, 1910, p. 87, text-fig. 122.
Reophax nodulosa, Heron-Allen and Earland, 1922, TN, p. 95.

One station: WS 433.

Fragments of one or two large specimens.

85. **Reophax moniliforme**, Siddall.

Reophax ? sp. Balkwill and Wright, 1885, DIS, p. 328, pl. xiii, figs. 9, 22–4.
Reophax moniliforme, Siddall, 1886, LMBC, p. 54, pl. i, fig. 2.
Reophax moniliforme, Heron-Allen and Earland, 1913, CI, p. 43, pl. ii, fig. 12.

Three stations: WS 86, 88, 92.

Two minute specimens at WS 88 and 92, and one rather larger one at WS 86. So far as we are aware this is the first record of the species outside the British Isles, but we have specimens in our collection from the Gulf of St Lawrence (212 fms.). The Falkland Islands specimens, although so small, present all the well-known characters of the species, the bulbous proloculum, the cylindrical test, largely composed of sponge spicules, and the deep ferruginous colour.

86. **Reophax flexibilis**, Schlumberger (Plate VII, fig. 21).

Reophax flexibilis, Schlumberger, 1894, FMAR, p. 243, pl. iii, fig. 10.

Two stations: WS 90, 217.

A single specimen of fourteen chambers (length 0·40 mm.) at WS 90 and two at WS 217 one of which has seventeen chambers. Schlumberger's record was from the Bay of Kola, in Arctic Russia. It appears to be nothing more than a non-selective form of *R. scottii* (C. 1892, FS, p. 57, pl. i, fig. 1) using sand grains instead of mica flakes with the result that the chambers retain their spherical shape instead of collapsing on drying. Occasional specimens are to be found in British gatherings where *R. scottii* occurs.

87. **Reophax distans var. pseudodistans**, Cushman (Plate VII, figs. 17–20).

Reophax spiculifera, Brady var. *pseudodistans*, Cushman, 1919, RFNZ, p. 598, pl. 75, fig. 1.
Reophax spiculifera (*pars*), Heron-Allen and Earland, 1922, TN, p. 95.

Three stations: WS 93, 246, 408.

Single chambers built entirely of sponge spicules at WS 93 and WS 408, and many similar isolated chambers at WS 246, together with one or two specimens in which two successive chambers have remained unbroken. These give the clue to the nature of the organism as the individual chambers might otherwise have been regarded as "selective" varieties of *Marsipella elongata*, Norman, nearly all the fragments having chambers of great length as compared with their width. Individual chambers range up to 1·50, or even 2·00 mm. in length, against a width of 0·30 to 0·50 mm. The stolon tube between two chambers may be as long as 2·0 mm.

The shape of the chambers is naturally dependent on the length of the spicules employed. When the organism uses long unbroken needles the chamber must obviously conform to their rigid line. When shorter or broken fragments are employed, the chambers exhibit a natural tendency to form "beads" connected by stolon tubes. Minute fragments of spicules must be employed in the tapering junction of the chamber and stolon, and this is the weak point in construction which is responsible for the fragmentary condition in which specimens usually occur, as already noted by Cushman (*ut supra*). There appears to be a definite point of weakness in the stolon tube at which chambers separate. It is marked by a line of spicule fragments built together at right angles to the main axis of the test and the direction of the other spicules. When moist the test is flexible at these points.

We prefer to associate Cushman's varietal name *pseudodistans* with Brady's species

distans of which we regard it as merely a selective form. *R. spiculifera*, Brady is a very different organism, perhaps a selective form of *R. dentaliniformis*.

88. **Reophax cushmani**, nom.nov. (Plate VII, figs. 22–24).

Reophax advena, Heron-Allen and Earland (*non* Cushman), 1922, TN, p. 94, pl. iii, figs. 6, 7.

One station: WS 246.

At WS 246 were found a good many specimens of the very roughly constructed organism, which in our Terra Nova Report (*ut supra*) we referred tentatively to *R. advena*, Cushman. The Falkland Islands specimens present the same curious characteristic of a loosely constructed and labyrinthine chamber, and are even more roughly constructed. In view of the points of difference to which we then drew attention, we have thought it advisable to separate the Terra Nova and Falkland Islands specimens from *R. advena*, and have pleasure in associating them with the name of our friend Dr J. A. Cushman.

Test free, arenaceous, consisting of 2–4 chambers arranged in a more or less curving line and exhibiting little increase from first to last. Constructed of very large sand grains irregularly built together with quantities of brown cement in which smaller sand grains are plentifully incorporated. In the earlier chambers the particles are firmly built together with a simple cavity. The final chamber in perfect specimens, by contrast, has the sand grains very loosely held together in a labyrinthic mass without much visible cement, which probably represents material collected and in process of building into a new chamber.

Length, up to 4·0 mm. Greatest breadth ranges up to 1·50 mm. or even 2·0 mm.

Genus **Hormosina**, Brady, 1879

89. **Hormosina globulifera**, Brady.

Hormosina globulifera, Brady, 1879, etc., RRC, 1879, p. 60, pl. iv, figs. 4, 5; 1884, FC, p. 326, pl. xxxix, figs. 1–6.
Hormosina globulifera, Heron-Allen and Earland, 1914, etc., FKA, 1915, p. 617, pl. xlvi, fig. 25.
Hormosina globulifera, Cushman, 1918, etc., FAO, 1920, p. 26, pl. vi, fig. 1.

One station: WS 210.

One large fragment probably representing the initial portion of a megalospheric individual.

Genus **Haplophragmoides**, Cushman, 1910

90. **Haplophragmoides canariensis** (d'Orbigny).

Nonionina canariensis, d'Orbigny, 1839, FIC, p. 128, pl. ii, figs. 33, 34.
Haplophragmium canariense, Brady, 1884, FC, p. 310, pl. xxxv, figs. 1–5.
Haplophragmium canariense, Heron-Allen and Earland, 1910, NBF, p. 425, fig. 2; 1913, CI, p. 45, pl. iii, fig. 5.
Haplophragmoides canariensis, Cushman, 1910, etc., FNP, 1910, p. 101, fig. 149.

Twenty-two stations: 48, 51, 388; WS 71, 76, 83, 84, 86, 87, 88, 89, 90, 92, 98, 99, 108, 109, 210, 213, 217, 225, 245.

Often very common yet at times surprisingly rare. It is most common at stations adjacent to the shores of the islands. The most usual type is a small flat evolute form, neatly constructed, mica flakes being largely used. The micaceous constituent is especially noticeable at WS 92, where the specimens are so thin-walled as to be collapsing. At WS 88 and 95 the specimens attain an unusual size for the area, and there is a complete series ranging from the smallest to the largest, all the specimens being of the flat type. At WS 71, large specimens with turgid chambers are rare, and the usual small compressed type is common, nothing intermediate between the two being found. It seems probable that the two forms may represent the megalo- and microspheric types; the Paris Type is missing.

91. **Haplophragmoides canariensis** var. **variabilis** (Heron-Allen and Earland).

Haplophragmium canariense, Heron-Allen and Earland, 1916, FWS, p. 223, pl. xl, figs. 12–13.
Haplophragmium canariense var. *variabilis*, Heron-Allen and Earland, 1916, FSC, p. 41, pl. vi, figs. 1–3.

One station: WS 88.

One small specimen in which a biserial mode of growth is adopted in the later chambers.

92. **Haplophragmoides crassimargo** (Norman).

Haplophragmium crassimargo, Norman, 1892, *Museum Normanianum*, pt. 8, p. 17 (note).
Haplophragmium crassimargo, Heron-Allen and Earland, 1910, NBF, p. 424, figs. 3, 4; 1913, FNS, p. 130, pl. x, figs. 5, 6.

Twelve stations: WS 83, 87, 97, 98, 99, 109, 210, 215, 217, 219, 225, 248.

Nearly all the stations at which the specimens occur lie to the north of the islands. At the stations to the south of the islands the species is extremely rare. The best specimens at WS 97–99 and 109.

93. **Haplophragmoides sphaeriloculum**, Cushman.

Haplophragmoides sphaeriloculum, Cushman, 1910, etc., FNP, 1910, p. 107, fig. 165.
Haplophragmium sphaeriloculum, Sidebottom, 1918, FECA, p. 15, pl. ii, figs. 15, 16.

Two stations: 228; WS 235.

Good specimens at 228, rare and less satisfactory at WS 235.

94. **Haplophragmoides scitulum** (Brady).

Haplophragmium scitulum, Brady, 1879, etc., RRC, 1881, p. 50; 1884, FC, p. 308, pl. xxxiv, figs. 11–13.
Haplophragmium scitulum, Chapman, 1914, FORS, p. 64, pl. iii, fig. 22.
Haplophragmoides scitulum, Cushman, 1910, etc., FNP, 1910, p. 103, figs. 153–5.

Two stations: WS 88, 408.

Very rare, but typical at WS 408.

95. **Haplophragmoides subglobosum** (G. O. Sars).

Lituola subglobosum, M. Sars, 1868, LUHD, p. 250; G. O. Sars, 1871, HF, p. 253.
Haplophragmium subglobosum, Brady, 1881, HNPE, p. 406.
Haplophragmium latidorsatum (*non* Bornemann), Brady, 1884, FC, p. 307, pl. xxxiv, figs. 7, 8, 10, 14.

Two stations: 230; WS 408.

Very rare, the specimens are small and poorly developed.

Genus **Ammobaculites**, Cushman, 1910

96. **Ammobaculites agglutinans** (d'Orbigny).

Spirolina agglutinans, d'Orbigny, 1846, FFV, p. 137, pl. vii, figs. 10–12.
Haplophragmium agglutinans, Brady, 1884, FC, p. 301, pl. xxxii, figs. 19–26.
Ammobaculites agglutinans, Cushman, 1910, etc., FNP, 1910, p. 115, fig. 176.

One station: WS 408.

Three rather roughly constructed individuals all of an elongate type. The Type of *Spirolina agglutinans* is missing in Paris.

97. **Ammobaculites americanus**, Cushman (Plate VIII, figs. 15–17).

Haplophragmium fontinense, Brady (*non* Terquem), 1884, FC, p. 305, pl. xxxiv, figs. 1–4.
Ammobaculites americanus, Cushman, 1910, etc., FNP, 1910, p. 117, figs. 184, 185.

Eight stations: WS 76, 98, 99, 109, 210, 215, 225, 408.

The chief distinction between Cushman's species and Terquem's *H. fontinense* appears to be in the size, for the convexity shown in Terquem's figure, to which Cushman draws attention, is not much greater than that often exhibited in his own species. Many of the Discovery specimens are in fact quite strongly curved. The species is neither widely distributed nor very abundant in the Falkland area, but very good specimens are found at WS 76 and 225, identical in fact with Cushman's figure. Equally good at WS 408, but using much finer material with correspondingly increased perfection of finish.

Genus **Placopsilina**, d'Orbigny, 1850

98. **Placopsilina cenomana**, d'Orbigny (Plate VII, fig. 25).

Placopsilina cenomana, d'Orbigny, 1850, etc., PP, vol. II, 1850, p. 185, no. 758.
Placopsilina cenomana, Reuss, 1854, KO, p. 71, pl. xxviii, figs. 4, 5.
Placopsilina cenomana, Brady, 1884, FC, p. 315, pl. xxxvi, figs. 1–3.

Ten stations: 51; WS 76, 77, 91, 92, 93, 225, 243, 246, 248.

Generally distributed and often very abundant, notably at WS 225, where the stones and pebbles were encrusted with it. The specimens are of a small, feeble, elongate type such as are found in British seas. One or two larger individuals similar to those found in tropical and sub-tropical seas have been noted, especially at 51. At WS 91, a complete specimen, detached from its support and revealing a chitinous floor was obtained.

Placopsilina confusa, Cushman (C. 1918, etc., FAO, 1920, p. 71, pl. xiv, fig. 6), is based on feeble specimens similar to those found in the Falkland area and figured by Brady (B. 1884, FC, pl. xxxvi, fig. 3) and ourselves. But Cushman's figure, and to some extent his description, appear to us to represent a distinctive organism which does not occur in the Falkland area. It has however been found in some of the Discovery material from the Antarctic area and will be dealt with by us in a subsequent report.

Brady's fig. 3 does not in our opinion possess any specific points of difference from the typical *P. cenomana*. It represents only a less robust form of growth such as might be expected in a normally tropical species extending its range into colder seas.

Sub-family *TROCHAMMININAE*

Genus **Ammolagena**, Eimer and Fickert, 1899

99. **Ammolagena clavata** (Jones and Parker).

Trochammina irregularis clavata, Jones and Parker, 1860, RFM, p. 304.
Webbina clavata, Brady, 1884, FC, p. 349, pl. xli, figs. 12–16.
Ammolagena clavata, Eimer and Fickert, 1899, AVF, p. 602 (674).

One station: WS 225.

Two typical specimens. Its absence from other stations is somewhat extraordinary.

Genus **Tolypammina**, Rhumbler, 1895

100. **Tolypammina vagans** (Brady).

Hyperammina vagans, Brady, 1879, RRC, etc., 1879, p. 33, pl. v, fig. 3; 1884, FC, p. 260, pl. xxiv, figs. 1–9.
Tolypammina vagans, Rhumbler, 1903, ZRR, p. 277–8, fig. 125.

Nine stations: 51; WS 73, 88, 92, 97, 98, 225, 243, 246.

This species is generally extremely abundant in any material where stones or any suitable surfaces of attachment occur. Often every little crevice in a pebble contains its specimen.

Genus **Ammodiscus**, Reuss, 1861

101. **Ammodiscus incertus** (d'Orbigny) (Plate VIII, figs. 18–20).

Operculina incerta, d'Orbigny, 1839, FC, p. 49, pl. vi, figs. 16, 17.
Spirillina arenacea, Williamson, 1858, RFGB, p. 93, pl. vii, fig. 203.
Ammodiscus incertus, Brady, 1884, FC, p. 330, pl. xxxviii, figs. 1–3.

Eight stations: 388; WS 71, 76, 88, 93, 99, 215, 217.

All the specimens are very small and far from typical, being rather roughly constructed and almost grey in colour. The coils are seldom flat or so regularly convoluted as is usually the case, and there appears to be a very distinct local form, which, while hardly worth separation as a species, is intermediate between *A. incertus* and *A. gordialis* (Plate VIII, fig. 20). The best series is at WS 217, other good ones at WS 76 and 93.

A single specimen of the megalospheric form (*A. tenuis*, B. 1884, FC, pl. xxxviii, figs. 4–6) at WS 88, consisting of a proloculum and a single coil, and a slightly larger specimen at 388. The entire absence of the megalospheric form at the other stations is noteworthy.

The *Operculina incerta* of d'Orbigny has always seemed to us to be open to suspicion as an arenaceous form. Neither the figure nor the text give us any suggestion of an agglutinate test, and either might equally well refer to a weather-stained *Spirillina* or *Cornuspira*. We therefore turned to the Paris Type in the hope of settling the question of its nature, only to find ourselves confronted with an apparent blank wall. The tube contains three specimens. It is labelled "*Spirillina incerta* (*Operculina*), Cuba". None of the three specimens can be recognized as the original of d'Orbigny's figure and they are all unmistakably *Cornuspira*. One is *C. involvens*, Reuss, the second probably the same but bearing striolations (these may be accidental), the third specimen is a narrow-tubed, square-edged form, suggesting *C. angigyra*, Reuss; they are all unmistakably fossils. The uncertainty is insoluble until d'Orbigny's original Cuba Type is perhaps identified among the tubes which have become separated from any identifying "boards".

Genus **Glomospira**, Rzehak, 1885

NOTE. The date of the genus *Glomospira* is generally given as 1888, in which year the name *Ammodiscus* (*Glomospira*) *gordialis* figures in a list of species (*Verh. k. k. geol. Reichaust. Berlin*, 30 June, 1888, p. 191). But the genus appears to have been perfectly well defined in Rzehak's paper on certain Oligocene Foraminifera in 1885 (*Verh. Naturf. Vereines. Brunn*, XXIII (1885), p. 127) in which he separates the plano-spiral from the globular (knäuel-förmig = ball-of-wool-shaped) forms.

102. **Glomospira gordialis** (Jones and Parker) (Plate VIII, figs. 21, 22).

Trochammina squamata gordialis, Jones and Parker, 1860, RFM, p. 304.
Ammodiscus gordialis, Brady, 1884, FC, p. 333, pl. xxxviii, figs. 7–9.
Ammodiscus (*Glomospira*) *gordialis*, Rzehak, 1888 (see NOTE above).

Eight stations: 53; WS 71, 80, 88, 90, 217, 225, 246.

The majority of the specimens are small, grey in colour like *A. incertus*, but large ferruginous examples were found at WS 225. It occurs sessile on shell fragments at WS 246. It is never as common as *A. incertus*, the best (of the grey type) at WS 88.

103. **Glomospira charoides** (Jones and Parker).

Trochammina squamata charoides, Jones and Parker, 1860, RFM, p. 304.
Ammodiscus charoides, Brady, 1884, FC, p. 334, pl. xxxviii, fig. 10–16.
Glomospira charoides, Rhumbler, 1909, etc., FPE, 1913, p. 422, pl. iv, fig. 8 (1909).

One station: WS 86.

A single example much eroded at WS 86

Genus Trochammina, Parker and Jones, 1859

104. Trochammina squamata, Jones and Parker.

Trochammina squamata, Jones and Parker, 1860, RFM, p. 304, and table.
Trochammina squamata, Heron-Allen and Earland, 1913, CI, p. 50, pl. iii, figs. 7–10.

Fourteen stations: 48, 51, 53; WS 71, 77, 87, 88, 89, 90, 91, 92, 93, 221, 248.

Less widely distributed and less abundant than *T. ochracea*. The best specimens at WS 87, 89, 92 and 93. Its distribution differs thus from that of *T. ochracea*. At most of the other stations it is represented by few and relatively small individuals. There are a good many specimens, notably at 53, which appear to be intermediate between *T. ochracea* and *T. squamata*. Sessile at WS 92.

105. Trochammina rotaliformis, J. Wright, MS.

Trochammina inflata (Montagu) var., Balkwill and Wright, 1885, DIS, pl. xiii, figs. 11, 12.
Trochammina rotaliformis, J. Wright, MS, Heron-Allen and Earland, 1913, CI, p. 52, pl. ii, figs. 11–13.

Four stations: 388; WS 83, 93, 408.

The specimens are small.

106. Trochammina glabra, sp.n. (Plate VII, figs. 26–28).

Two stations: 388; WS 88.

Test free, trochoid, spire somewhat elevated and dome-shaped, consisting of three whorls gradually increasing in diameter, the outer containing eight chambers. All chambers visible on the dorsal side, but the earlier series are often difficult to observe owing to the extreme smoothness of the surface, the slightly curved sutural lines on this side being thin and quite flush. On the ventral side the sutures are depressed and straight and the chambers of the last convolution are quite distinct. They slope inwards to a deeply sunk umbilicus. The aperture is large and loop-shaped on the inner edge of the final chamber. Colour, brown of various shades. Constructed of very fine sandy material with a large proportion of cement, the surface being very smooth and polished.

Diameter up to 0·50 mm. Thickness 0·20 mm.

This very handsome species was found in some numbers at 388 and WS 88, but not elsewhere. Its nearest ally is *T. rotaliformis*, J. Wright, which it resembles in form, differing principally in the number of chambers, which in Wright's species are only 4–5 in a whorl.

107. Trochammina ochracea (Williamson).

Rotalina ochracea, Williamson, 1858, RFGB, p. 55, pl. iv, fig. 112; pl. v, fig. 113.
Trochammina ochracea, Balkwill and Millett, 1884, FG, p. 25, pl. i, fig. 7.

Twenty-three stations: 48, 53, 228, 230, 388; WS 71, 77, 79, 83, 84, 86, 87, 88, 89, 90, 91, 92, 93, 108, 213, 221, 245, 408.

Almost universally distributed. At southerly stations, WS 84, 87, 88, 89, the species attains fine and typical dimensions. At nearly all the other stations it is represented by comparatively small individuals. Sessile individuals were found at WS 77, 84, 87 and 88. The best specimens were at WS 88, where it was very common.

108. **Trochammina inflata** (Montagu).

Nautilus inflatus, Montagu, 1803–8, TB, Suppl. p. 81, pl. xviii, fig. 3.
Trochammina inflata, Brady, 1884, FC, p. 338, pl. xli, fig. 4.

Three stations: WS 83, 246, 409.

A single specimen at each station, none of them quite typical.

109. **Trochammina malovensis**, Heron-Allen and Earland (Plate XVII, figs. 14–19).

Trochammina malovensis, Heron-Allen and Earland, 1929, etc., FSA, 1929, p. 328, pl. iv, figs. 27–32.

Thirteen stations: 48, 51; WS 71, 76, 77, 80, 83, 88, 92, 93, 99, 108, 225.

Test free, minute, arenaceous, consisting of numerous chambers arranged in a trochoid spiral of four or five coils. About five chambers in each convolution, neatly constructed of fine sand and sponge spicules with more or less ferruginous cement, the colour of the whole test varying accordingly from white to brown. Sutures flush in early stages, but rather deeply depressed in the last convolution, owing to the rapid inflation of the chambers, which results in a lobulate periphery to the shell. All chambers visible on the superior face, only those of the last convolution on the inferior side, which is deeply excavated in the centre. Aperture a loop-like slit on the inner edge of the final chamber.

Dimensions: diameter, 0·16–0·25 mm.; height, 0·12 mm.

This pretty little species belongs to the *inflata* group. Its nearest allies are probably *T. rotaliformis*, J. Wright, a common British species, from which it differs in the greater height of the spire and in the number of chambers, and *T. pacifica*, Cushman, a very similar but much larger and more coarsely constructed form from British Columbia. It is one of the most characteristic of the Falkland Islands Foraminifera, occurring with more or less frequency at thirteen stations, the best specimens being found at 48 (105 m.) and WS 88 (118 m.). It is named after the Falkland Islands, the "Îles Malouines" of d'Orbigny's *Voyage dans l'Amérique Méridionale*. It occurs also, and even more frequently, in the South Georgia area.

110. **Trochammina nana** (Brady).

Haplophragmium nanum, Brady, 1879, etc., RRC, 1881, p. 50; 1881, HNPE, p. 99, pl. ii, figs. 1 *a–c*; 1884, FC, p. 311, pl. xxxv, figs. 6–8.
Trochammina nana, Cushman, 1918, etc., FAO, 1920, p. 80, pl. xvii, fig. 1.

One station: 48.

A few specimens, including one sessile individual.

110 A. **Trochammina globigeriniformis** (Parker and Jones).

Lituola nautiloidea var. *globigeriniformis*, Parker and Jones, 1865, NAAF, p. 407, pl. xv, figs. 46, 47; pl. xvii, figs. 96–8.
Haplophragmium globigeriniforme, Brady, 1884, FC, p. 312, pl. xxxv, figs. 10, 11.
Trochammina globigeriniformis, Cushman, 1910, etc., FNP, 1910, p. 124, figs. 193–5.

One station: WS 433.

Very rare but quite typical.

111. **Trochammina bradyi**, Robertson.

Trochammina robertsoni, Brady, 1887, SBRF, p. 893.
Trochammina robertsoni, Wright, 1891, SWI, p. 469, pl. xx, figs. 4 *a*, *b*.
Trochammina bradyi, Robertson, *Ann. Mag. Nat. Hist.*, 1891, S. 6, VII, p. 388.

One station: WS 76.

One typical specimen.

Genus Globotextularia, Eimer and Fickert, 1899

112. **Globotextularia anceps** (Brady) (Plate VIII, figs. 23, 24).

Haplophragmium anceps, Brady, 1884, FC, p. 313, pl. xxxv, figs. 12–15.
Haplophragmium anceps, Heron-Allen and Earland, 1913, CI, p. 47, pl. iii, fig. 4.
Globotextularia anceps, Eimer and Fickert, 1899, AVF, p. 679 (in the reprints, p. 607), fig. 25.

Two stations: WS 88, 217.

Good specimens at WS 88, where it was not uncommon; they are small and of a very neatly constructed type, with three chambers to a convolution. One doubtful specimen at WS 217.

Genus Nouria, Heron-Allen and Earland, 1914

113. **Nouria polymorphinoides**, Heron-Allen and Earland (Plate VIII, figs. 25, 26).

Reophax ampullacea, Millett, 1898, etc., FM, 1899, p. 253, pl. iv, fig. 9.
Nouria polymorphinoides, Heron-Allen and Earland, 1914, etc., FKA, 1914, p. 376, pl. xxxvii, figs. 1–15; 1915, p. 615.
Nouria polymorphinoides, Halkyard, 1919, BMB, p. 22, pl. i, figs. 6, 7.
Nouria polymorphinoides, Cushman, 1919, RFNZ, p. 601, pl. lxxv, figs. 4, 5.

One station: WS 88.

At WS 88 the species is not uncommon and, as usual, it presents a considerable range of form. Most of the variations figured by us in the Kerimba Monograph occur, but the most usual type is the compressed neat form originally described from New Zealand waters. The shell construction however is very different, the New Zealand specimens utilising obsidian flakes almost to the exclusion of other material, whereas the Falkland Islands specimens utilise sand grains, mica and sponge spicules in almost equal proportions. The occurrence of this Indo-pacific species in the Falkland area is noteworthy.

It will be observed that we give Millett's *Reophax ampullacea* as a synonym of *N. polymorphinoides*. This is the result of an examination of his Types, now in our collection, which are clearly multilocular. It does not necessarily affect the original Types of Brady's *R. ampullacea* which we have not examined.

113 A. **Nouria harrisii**, Heron-Allen and Earland.

Nouria harrisii, Heron-Allen and Earland, 1914, etc., FKA, 1914, p. 376, pl. xxxvii, figs. 16–20.
Nouria harrisii, Cushman, 1924, SF, p. 10, pl. i, fig. 1.

One station: 388.

A single specimen found at St. 388 off Cape Horn is probably referable to our species. It differs from the original types in the absence of the basal anchoring spicules and a lesser display of selective power, the basal half of the test being constructed rather roughly of sand grains and cement, the upper half being constructed of spicules regularly arranged in vertical rows.

The specimen figured by Cushman from Samoa (*ut supra*) has a somewhat similar agglutinate base, but with a single anchoring spicule. Our record marks a wide extension of the range of the species.

Sub-family *LOFTUSINAE*

Genus **Cyclammina**, Brady, 1876

114. **Cyclammina cancellata**, Brady.

Cyclammina cancellata, Brady, 1879, etc., RRC, 1879, p. 62 (Nautiloid *Lituola*); 1884, FC, p. 351, pl. xxxvii, figs. 8–16.
Cyclammina cancellata, Cushman, 1910, etc., FNP, 1910, p. 110, figs. 168–171.

Seven stations: 228; WS 76, 99, 215, 245, 408, 433.

Occurs in both micro- and megalospheric forms, the latter only at WS 245. The microspheric specimens are very noticeable owing to their grey colour and polished surface, in which a minimum quantity of sand grains are imbedded in fine cement. In rare cases the sand grains are so few in number as to be barely noticeable. At WS 99, specimens of similar construction, but ferruginous in colour, occur; the best examples at WS 215, 433.

Family TEXTULARIIDAE

Sub-family *TEXTULARIINAE*

Genus **Spiroplectammina**, Cushman, 1927

115. **Spiroplectammina biformis** (Parker and Jones) (Plate VIII, figs. 27–31).

Textularia agglutinans var. *biformis*, Parker and Jones, 1865, NAAF, p. 370, pl. xv, figs. 23, 24.
Textularia biformis, Brady, 1878, RRNP, p. 436, pl. xx, fig. 8.
Spiroplecta biformis, Brady, 1884, FC, p. 376, pl. xlv, figs. 25–7.
Spiroplectammina biformis, Cushman, 1925, etc., LFR, 1927, III, p. 23, pl. v, fig. 1.

Twelve stations: 388; WS 76, 77, 88, 90, 98, 109, 210, 215, 217, 225, 246.

Often very common, especially at WS 76. At most of the stations two distinct forms occur, one characterized by a small and outstanding crozier-shaped initial portion followed by a long series of biserial chambers regularly broadening. In the other, the crozier portion is much larger, and it is less prominent because it is immediately followed by a short series of biserial chambers all of approximately the same breadth as the initial spiral. These two forms represent respectively the micro- and megalospheric forms. The Falkland type is as a rule much more compressed than the usual run of specimens in northern waters. Highly compressed specimens at WS 88, 90, 98 and 246. At WS 217, where the species is common, the microspheric form predominates.

Genus Textularia, Defrance, 1824

116. Textularia agglutinans, d'Orbigny.

Textularia agglutinans, d'Orbigny, 1839, FC, p. 144, pl. i, figs. 17, 18, 32–4.
Textularia agglutinans, Brady, 1884, FC, p. 363, pl. xliii, figs. 1–3; vars. figs. 4, 12.

Two stations: 388; WS 408.

One large specimen at 388 and a very small one at WS 408.

117. Textularia candeiana, d'Orbigny.

Textularia candeiana, d'Orbigny, 1839, FC, p. 143, pl. i, figs. 25–7.
Textularia candeiana, Heron-Allen and Earland, 1914, etc., FKA, 1915, p. 627, pl. xlvii, figs. 10–16.

Two stations: 388; WS 83.

A single specimen at each station.

118. Textularia abbreviata, d'Orbigny.

Textularia abbreviata, d'Orbigny, 1846, FFV, p. 249, pl. xv, figs. 7, 8, 10–12.
Textularia abbreviata, Cushman, 1910, etc., FNP, 1911, p. 14, fig. 20.

One station: WS 217.

A single specimen identical with the Type in Paris.

19. Textularia gramen, d'Orbigny.

Textularia gramen, d'Orbigny, 1846, FFV, p. 248, pl. xv, figs. 4–6.
Textularia gramen, Balkwill and Wright, 1885, DIS, p. 332, pl. xiii, figs. 13, 14.

Two stations: 388; WS 92.

Only a few specimens. The Paris Type is missing.

120. Textularia fusiformis, Chaster.

Textularia fusiformis, Chaster, 1892, FS, p. 58, pl. i, fig. 3.
Textularia fusiformis, Heron-Allen and Earland, 1914, etc., FKA, 1915, p. 623; 1916, FWS, p. 229.

Three stations: WS 77, 88, 217.

Single specimens at WS 77 and 88 and several at WS 217. They are all rather more compressed than is usual, but otherwise agree with Chaster's Types in our collection. The species, though never very common, is widely distributed, and we have specimens from localities as widely separated as the Barentz Sea and Tahiti.

Genus Verneuilina, d'Orbigny, 1840

121. Verneuilina advena, Cushman.

Verneuilina polystropha, Heron-Allen and Earland, 1913, CI, p. 55, pl. iv, figs. 3–5.
Verneuilina advena, Cushman, 1918, etc., FAO, 1922, p. 57, pl. ix, figs. 7–9.
Verneuilina pusilla, Heron-Allen and Earland (*non* Goës), 1920, VP (*passim*), pl. xvi, fig. 11, pl. xvii, figs. 12, 13.
Verneuilina advena, Cushman, 1921, FHB, p. 141 (no pls.).

Five stations: WS 71, 83, 88, 93, 433.

Single specimens only, all of the short form as figured by us (fig. 13), in 1920 *ut supra*. The texture of the shell is somewhat coarser than is usually the case, but we have met with British specimens of similarly rough construction. Cushman's species is based upon the "minute type" which we figured first from Clare Island in 1913, and subsequently (in 1920) identified as *V. pusilla*, Goës. Cushman states (C. 1910, etc., FNP, 1911, p. 57) that he has examined the Types of Goës, and finds that they do not fit his description or figures at all well. He regards the Types as specimens of *V. polystropha* (Reuss). As the dimensions given by Goës for *V. pusilla* (length 0·50–0·66 mm.) are very much greater than those of our form (0·17–0·30 mm.) we feel compelled to abandon the attribution to *V. pusilla* and to accept the new specific name.

Genus **Valvulina**, d'Orbigny, 1826

122. **Valvulina conica**, Parker and Jones.

Valvulina triangularis, Parker and Jones, 1857, FCN, p. 295, pl. xi, figs. 15, 16.
Valvulina triangularis var. *conica*, Parker and Jones, 1865, NAAF, p. 406, pl. xv, fig. 27.
Valvulina conica, Brady, 1884, FC, p. 392, pl. xlix, figs. 15, 16.

Two stations: WS 71, 88.

A single very small specimen from WS 71, and another at WS 88.

Sub-family *BULIMININAE*

Genus **Bulimina**, d'Orbigny, 1826

123. **Bulimina pupoides**, d'Orbigny.

Bulimina pupoides, d'Orbigny, 1846, FFV, p. 185, pl. xi, figs. 11, 12.
Bulimina pupoides, Terrigi, 1880, SGP, p. 193, pl. ii, fig. 30.

Three stations: 230; WS 89, 221.

Rare everywhere. The best at WS 89.

124. **Bulimina fusiformis**, Williamson.

Bulimina pupoides var. *fusiformis*, Williamson, 1858, RFGB, p. 63, pl. v, figs. 129, 130.
Bulimina fusiformis, Millett, 1898, etc., FM, 1900, p. 275, pl. ii, fig. 2.

Five stations: WS 89, 90, 97, 215, 217.

Very good specimens at WS 90, less typical at WS 215, 217.

125. **Bulimina ovata**, d'Orbigny.

Bulimina ovata, d'Orbigny, 1846, FFV, p. 185, pl. xi, figs. 13, 14.
Bulimina ovata, Brady, 1884, FC, p. 400, pl. l, fig. 13.

Three stations: 228, 235; WS 217.

Very rare, but fine specimens at each station.

126. **Bulimina ovula**, d'Orbigny (Plate VIII, fig. 32).

Bulimina ovula, d'Orbigny, 1839, FAM, p. 51, pl. i, figs. 10, 11.
Bulimina ovula, Cushman, 1927, FWCA, p. 150, pl. ii, fig. 10.
Bulimina ovula, Cushman, 1925, etc., LRF, 1926, II, p. 55, pl. vii, fig. 2.

Two stations: WS 76, 99.

A single specimen at WS 76, probably referable to d'Orbigny's species, which was originally recorded from the Peruvian coast. Two large and typical specimens at WS 99. The Type was not to be found in Paris.

127. **Bulimina elegans**, d'Orbigny.

Bulimina elegans, d'Orbigny, 1826, TMC, p. 270, no. 10, Modèle no. 9.
Bulimina elegans, Brady, 1884, FC, p. 398, pl. l, figs. 1-4.

Three stations: WS 90, 92, 95.

Never common and none of the specimens very typical. The chambers are, as a rule, somewhat inflated and with a tendency to form cusps approaching *B. marginata*.

128. **Bulimina elegans var. exilis**, Brady.

Bulimina elegans var. *exilis*, Brady, 1884, FC, p. 399, pl. l, figs. 5, 6.
Bulimina elegans var. *exilis*, Heron-Allen and Earland, 1916, FWS, p. 234, pl. xli, figs. 4-9.

One station: WS 210.

A single specimen, not very typical.

129. **Bulimina marginata**, d'Orbigny.

Bulimina marginata, d'Orbigny, 1826, TMC, p. 269, no. 4, pl. xii, figs. 10-12.
Bulimina pupoides var. *marginata*, Williamson, 1858, RFGB, p. 62, figs. 126, 127.
Bulimina marginata, Brady, 1884, FC, p. 405, pl. li, figs. 3-5.

Seven stations: 48; WS 83, 84, 90, 92, 210, 245.

Rare. The best at WS 83 and 90. There is, as usual, a tendency to run into *B. aculeata*.

130. **Bulimina patagonica**, d'Orbigny (Plate VIII, figs. 33, 34).

Bulimina patagonica, d'Orbigny, 1839, FAM, p. 50, pl. i, figs. 8, 9.
Bulimina patagonica, Cushman and Wickenden, 1929, FJF, p. 8, pl. iii, fig. 11.

Three stations: WS 86, 90, 248.

Rare, excepting at WS 248, and never very typical. D'Orbigny records it as "very rare" from the Bay of St Blas in Patagonia. The specimens figured by Cushman and Wickenden (*ut supra*) do not appear to have much in common with d'Orbigny's species. His Type is not to be found in Paris.

131. **Bulimina aculeata**, d'Orbigny.

Bulimina aculeata, d'Orbigny, 1826, TMC, p. 269, no. 7.
Bulimina aculeata, Brady, 1884, FC, p. 406, pl. li, figs. 7-9.
Bulimina aculeata, Cushman, 1910, etc., FNP, 1911, p. 86, fig. 139.

Four stations: 51; WS 80, 88, 89.

Represented by a few specimens only, the best at WS 80 and 89.

132. **Bulimina inflata**, Seguenza.

Bulimina inflata, Seguenza, 1862, RFC, p. 109 (p. 25 in the reprint), pl. i, fig. 10.
Bulimina inflata, Schwager, 1866, FKN, p. 246, pl. vii, fig. 91.

Three stations: 236; WS 408, 433.

Single typical specimens at the two former stations; common at WS 433.

133. **Bulimina minutissima**, Wright.

Bulimina minutissima, Wright, 1902, GFL, p. 190, pl. xiii, figs. 9–12.
Bulimina minutissima, Heron-Allen and Earland, 1913, CI, p. 62, pl. iv, figs. 11, 12.

One station: WS 71.

A single specimen. The occurrence of this well-marked little species so far from its original locus of origin is very remarkable.

134. **Bulimina subteres**, Brady.

Bulimina subteres, Brady, 1879, RRC, etc., 1881, p. 55; 1884, FC, p. 403, pl. l, figs. 17, 18.
Bulimina subteres, Heron-Allen and Earland, 1913, CI, p. 62, pl. iv, figs. 13, 14.

Three stations: 388; WS 88, 93.

Very large and fine specimens at 388 and WS 88.

135. **Bulimina elegantissima**, d'Orbigny (Plate VIII, figs. 35–37).

Bulimina elegantissima, d'Orbigny, 1839, FAM, p. 51, pl. vii, figs. 13, 14.
Bulimina elegantissima, Williamson, 1858, RFGB, p. 64, figs. 134, 135.

Three stations: 53; WS 89, 90.

Never abundant. The best specimens at WS 89. They are as a rule less pointed at the aboral extremity than is shown in d'Orbigny's figure. The Type was not to be found in Paris.

136. **Bulimina seminuda**, Terquem (Plate VIII, figs. 38–41).

Bulimina seminuda, Terquem, 1882, FEP, p. 117, pl. xii (xx), fig. 21.
Bulimina elegantissima var. *seminuda*, Brady, 1884, FC, p. 403, pl. l, figs. 23, 24.

Eight stations: 48, 388; WS 71, 84, 86, 87, 88, 89, 93.

The best specimens at WS 87 and 88, where it was quite common and exhibited a great range of size. The surface is as a rule absolutely smooth, the sutural lines being hardly visible. At WS 71 and 87, several specimens seem, from the appearance of the final chamber, to have been in a plastogamic condition, or to have undergone the process of budding. No specimens actually seen in either condition, except at 388 where two very fine plastogamic pairs were found.

137. **Bulimina auricula**, sp.n. (Plate IX, figs. 1, 2).

One station: WS 88.

Test minute, white, consisting of $2\frac{1}{2}$ convolutions only, of which the final convolution forms almost the entire bulk of the shell. This final convolution consists of five chambers

increasing rapidly in size and breadth. Sutures thick and distinct, very slightly depressed. Terminal face of final chamber large and flattened, furnished with pleated depressions running from the outer edge to the inner margin, where the aperture is situated in a slight depression.

Length, 0·24 mm.; breadth of oral face, 0·18 mm.

Although only a single specimen was found, it presents such characteristic features as to deserve specific mention. It belongs to the group *B. seminuda* with which, however, it cannot be confused. Its nearest ally is *B. auriculata* Terquem (T. 1882, FEP, p. 115, pl. xii, fig. 14), which, however, is more elongate, has flush sutures and an entirely different oral face. Terquem's specific name, it may be pointed out, had been anticipated by Bailey as far back as 1851 for a very different form (B. 1851, SAC, p. 12, pl. O, figs. 25–27).

Genus Virgulina, d'Orbigny, 1826

138. **Virgulina schreibersiana**, Czjzek.

Virgulina schreibersiana, Czjzek, 1848, FWB, p. 147, pl. xiii, figs. 18–21.
Virgulina pupoides var. *compressa*, Williamson, 1858, RFGB, p. 63, fig. 131.

Nineteen stations: 51, 228, 230; WS 76, 80, 83, 86, 87, 88, 92, 93, 98, 99, 210, 215, 221, 225, 245, 248.

Often very common and almost universally distributed. The best specimens and most numerous were obtained from WS 86 and 248. There is, as usual, a considerable amount of variation, a long narrow form, and a shorter, broader form with fewer, but more inflated chambers, which occurs with the type at most stations where it is abundant. They presumably represent the megalo- and microspheric types.

139. **Virgulina schreibersiana** var. **spinosa**, var.n. (Plate IX, figs. 3, 4).

Two stations: 230, 236.

At 230 and 236 (close together between Cape Horn and the Falkland Islands) a variety occurs sparingly, distinguished by the upper outer marginal edge of the chambers being drawn out into a sharp incurved point or cusp, somewhat resembling the awns on a grass seed. The shell is remarkably thin-walled, showing iridescent colours at 236, and this variation may be due to depauperation of the type, which is normally rather robustly built at 230. At 236, the type was conspicuous by its absence. The variety bears considerable resemblance to *V. schreibersiana* var. *marginata*, Heron-Allen and Earland, described and figured by us in 1922 from South Nigeria (*Geol. Survey of S. Nigeria*, Bull. no. 3, 1922, Appendix, p. 142, pl. xii, figs. 4 *a*, *b*), but the cusps are much more conspicuous and strongly developed in the Falkland specimens than in that variety.

140. **Virgulina subsquamosa**, Egger.

Virgulina subsquamosa, Egger, 1857, MSO, p. 295, pl. xii (pl. viii in the reprint), figs. 19–21.
Virgulina subsquamosa, Brady, 1884, FC, p. 415, pl. lii, figs. 10, 11.

Two stations: 228, 230.

At these stations, typical specimens of the original compressed type of Egger occur. His records are mainly from the South Pacific Ocean.

141. **Virgulina bradyi**, Cushman.

Virgulina subsquamosa, Brady (*non* Egger), 1884, FC, p. 415, pl. lii, figs. 9 *a–c* (? 7, 8).
Virgulina bradyi, Cushman, 1918, etc., FAO, 1922, p. 115, pl. xxiv, fig. 1.

Seven stations: 236; WS 77, 86, 221, 248, 408, 433.

Moderately common. Cushman has separated the sub-cylindrical and few-chambered forms figured by Brady (*ut supra*) from the compressed and more regularly disposed type originally figured by Egger (*ut supra*, No. 140) on what appear to be sufficient grounds, as the two forms do not always occur in company in our material.

Genus Spiroplectoides, Cushman, 1927

142. **Spiroplectoides rosula** (Ehrenberg) (Plate IX, figs. 5, 6).

Spiroplecta rosula, Ehrenberg, 1854, M, II, Index, p. 24, pl. xxxii, fig. 26.
Textularia complexa, Brady, 1865, RFND, p. 101, pl. xii, fig. 6.
Spiroplecta demersa, Ehrenberg, *Abh. k. Ak. Wiss. Berlin*, 1872, p. 294; 1873, LMT, p. 391, pl. vii, fig. 26.
Spiroplectoides rosula, Cushman, LFR, 1927, III, p. 114, pl. xxiii, figs. 6, 7.

One station: WS 408.

Several good specimens. The records of this species are very few, but the discovery of specimens in such a distant locality as the Falkland Islands may indicate that it is widely distributed, and that its very minute size may be the reason for the paucity of the records. We give *S. demersa* as a synonym doubtfully; the construction of the shell is not given by Ehrenberg, though the colour is stated to be yellow, suggesting an arenaceous shell, but the figure is clearly hyaline. The identity of *Textularia complexa* is also not above suspicion if the dimensions given by Brady (length $\frac{1}{50}$ inch) are correct. *S. rosula* is only about one-third of this length.

Genus Bolivina, d'Orbigny, 1839

143. **Bolivina punctata**, d'Orbigny.

Bolivina punctata, d'Orbigny, 1839, FAM, p. 63, pl. viii, figs. 10–12.
Bolivina punctata, Brady, 1884, FC, p. 417, pl. lii, figs. 18, 19.

Twenty-two stations: 48, 228, 236 and WS 71, 77, 78, 79, 83, 86, 88, 89, 90, 92, 93, 97, 215, 217, 221, 245, 248, 408, 433.

Universally distributed, often very common. Both megalo- and microspheric forms are represented, the best specimens at 236 and WS 83, 93, 217, 221 and 408. At some of these stations, the specimens are very large and remarkably hyaline. The Paris "Amérique méridionale" Type tube contains only a single small specimen: it is quite opaque and the punctation is consequently not obvious, but it agrees on the whole with his figure.

144. **Bolivina textilarioides**, Reuss.

Bolivina textilarioides, Reuss, 1862, NHG, p. 81, pl. x, fig. 1.
Bolivina textilarioides, Brady, 1884, FC, p. 419, pl. lii, fig. 23 (only).
Bolivina textilarioides, Heron-Allen and Earland, 1916, FWS, p. 238, pl. xli, figs. 10–14.

Eleven stations: 53, 235, 236; WS 79, 83, 87, 89, 90, 93, 97, 433.

Never very common and never quite typical. At most of the stations the species is represented by a rough and thick-walled variety very similar to that figured by us (*ut supra*). At 235 and WS 87, 90, this roughness is confined to the upper margin of the chambers, approaching the form separated by Cushman under the specific name *spinescens*.

145. **Bolivina spinescens**, Cushman (Plate IX, figs. 7, 8).

Bolivina textilarioides, Brady, 1884, FC, p. 419, pl. lii, figs. 24, 25.
Bolivina spinescens, Millett, 1898, etc., FM, 1900, p. 542, pl. iv, fig. 5.
Bolivina spinescens, Cushman, 1910, etc., FNP, 1911, p. 46, fig. 76.

Three stations: 235, 236; WS 433.

At these stations, the variation referred to under the last species reaches its maximum development, and specimens unquestionably referable to Cushman's species are found, common at WS 433.

146. **Bolivina robusta**, Brady.

Bolivina robusta, Brady, 1879, etc., RRC, 1881, p. 57; 1884, FC, p. 421, pl. liii, figs. 7–9.
Bolivina robusta, Cushman, 1918, etc., FAO, 1922, p. 46, pl. vi, fig. 6.

Eight stations: WS 79, 83, 88, 97, 109, 210, 217, 245.

Rare, and as a rule rather pauperate. Good specimens at WS 97, and others, less typical, at WS 210, 217, 245.

147. **Bolivina compacta**, Sidebottom.

Bolivina compacta, Sidebottom, 1904, etc., RFD, 1905, p. 15, pl. iii, fig. 7.
Bolivina compacta, Cushman, 1910, etc., FNP, 1911, p. 36, fig. 58.

Two stations: 388; WS 88.

Several good specimens at each station.

148. **Bolivina dilatata**, Reuss.

Bolivina dilatata, Reuss, 1849–50, FOT, p. 381, pl. iii (xlviii), fig. 15.
Bolivina dilatata, Cushman, 1910, etc., FNP, 1911, p. 33, fig. 54.

Seven stations: WS 79, 80, 88, 90, 92, 99, 408.

At many stations the specimens are rather poor, but excellent and typical individuals occur at WS 88, smaller and less typical at WS 90 and 92.

149. **Bolivina difformis** (Williamson).

Textularia variabilis var. *difformis*, Williamson, 1858, RFGB, p. 77, pl. vi, figs. 166, 167.
Bolivina difformis, Brady, 1887, SBRF, p. 899.

Five stations: 48; WS 90, 92, 99, 408.

Rare. All the specimens are poorly developed, especially as regards the marginal spines so characteristic of British specimens.

150. **Bolivina variabilis** (Williamson).

Textularia variabilis (typica), Williamson, 1858, RFGB, p. 76, pl. vi, figs. 162, 163 (incorrectly numbered 161 and 162 on the plate).
Bolivina variabilis, Cushman, 1918, etc., FAO, 1922, p. 49, pl. iv, fig. 3.

Fifteen stations: 48, 51, 53, 228; WS 71, 77, 83, 89, 90, 91, 92, 221, 245, 408, 409.

Often common, and, as in British gatherings, subject to a good deal of variation in the smoothness of the external shell, which tends imperceptibly in the direction of *B. pseudo-plicata*. The best examples at WS 71, 83, 221. At this last station some specimens exhibited curvature of the long axis.

151. **Bolivina pseudo-plicata**, Heron-Allen and Earland (Plate IX, figs. 9–11).

Bolivina plicata, Brady, 1870, FTR, p. 302, pl. xii, figs. 7 *a*, *b* (*non* d'Orbigny, 1839, FAM, p. 62, pl. viii, figs. 4–7).
Bolivina plicata, Halkyard, 1889, RFJ, p. 65, pl. i, fig. 13.
Bolivina pseudo-plicata, Heron-Allen and Earland, 1930, FPD, p. 81, pl. iii, figs. 36–40.
Bolivina plicatella, Cushman, 1930, FCFF, p. 46, pl. viii, fig. 10.
Bolivina plicatella, Cushman and Parker, 1931, ACSA, p. 15, pl. iii, fig. 19.

Twelve stations: 48, 51; WS 71, 77, 88, 90, 91, 92, 93, 99, 221, 409.

Fairly frequent at the stations where it occurs and quite indistinguishable from British specimens. Like them it presents considerable range of form, two well-marked types predominating, long and narrow and short and broad respectively. These probably represent the megalo- and microspheric forms. The best specimens at 48 and WS 88, 90, 92 and 221. (See p. 302.)

152. **Bolivina inflata**, Heron-Allen and Earland.

Bolivina inflata, Heron-Allen and Earland, 1913, CI, p. 68, pl. iv, figs. 16–19; 1915, FKA, p. 648; 1916, FSC, p. 43; 1916, FWS, p. 240.
Bolivina inflata, Cushman, 1918, etc., FAO, 1922, p. 35, pl. ix, figs. 1–4.

Nine stations: 51, 388; WS 77, 83, 88, 90, 92, 93, 221.

Very rare, the best at WS 92, 93 and 221.

153. **Bolivina malovensis**, sp.n. (Plate IX, figs. 12–15).

Twelve stations: 228, 230, 388; WS 71, 83, 88, 89, 91, 92, 93, 221, 408.

Test compressed, cuneate, broadening rather rapidly at the oral extremity. Containing from 8 to 10 pairs of parallel-sided chambers increasing regularly in size. The apex is bluntly rounded, with visible proloculum in the megalospheric stage, more pointed in the microspheric. Marginal edge thick and rounded, straight at first, becoming slightly lobulate towards the aperture. Aperture normal. Sutures distinct, slightly depressed; surface smooth but not polished, sometimes slightly frosted or

roughened. Colour nearly white but the earlier chambers are often brownish. The perforations are extremely minute.

Length, 0·27–0·31 mm.; breadth, 0·11–0·12 mm.; thickness, 0·06 mm.

The distribution of *B. malovensis* appears to be confined to the southern area of the Falklands. It is not uncommon at those stations where it occurs, the best of the specimens being recorded from WS 71, 88 and 89. There is little variation except in the lobulation of the edge and the slightly roughened surface.

154. **Bolivina cincta**, sp.n. (Plate IX, fig. 16–18).

Fourteen stations: 228, 230, 235, 236; WS 76, 88, 93, 97, 221, 245, 248, 408, 409, 433.

Test leaf-shaped, the length being usually about double the breadth; compressed on both sides, consisting of about 5–7 pairs of flattened chambers separated by very strongly limbate sutural lines; marginal edge somewhat thickened, broad and flat, slightly recessed at each chamber; surface of the chambers between the limbate sutures, roughened and opaque, becoming smooth and more translucent in the final chambers. Aperture a large slit on the final chamber. Colour dirty white, opaque except at oral end.

Length, 0·25 mm.; breadth, 0·15 mm.; thickness, 0·03 mm.

This little species is widely distributed in the Falkland area but never very common. Most numerous and best at 228 and WS 245 and 408. Two distinct forms varying in length and breadth are found at most stations; the short, broad form is mostly about half the size of the larger, narrower form. There is no difference in their external appearance, and the proloculum is apparently identical. There is a certain amount of variation in the strength of the limbation, which may entirely disappear from the later chambers, but the species is, as a whole, very uniform and characteristic.

155. **Bolivina rhomboidalis** (Millett).

Textularia rhomboidalis, Millett, 1898, etc., FM, 1899, p. 559, pl. vii, fig. 4.
Textularia rhomboidalis, Sidebottom, 1904, etc., RFD, 1905, p. 8, pl. ii, figs. 2, (?) 3.
Bolivina rhomboidalis, Cushman, 1922, FTR, p. 28.

One station: 51.

A single typical specimen was found at 51 which is close to the north shore of the islands. Its presence is difficult to account for, as it is believed that the precautions taken to prevent fouling of sieves are sufficient to ensure it not having been derived from a distant locality.

The species is of frequent occurrence in the tropical and sub-tropical Indo-Pacific region, in the Mediterranean, and more rarely in the West Indies and tropical Atlantic.

Genus **Bifarina**, Parker and Jones, 1872

156. **Bifarina porrecta** (Brady).

Bolivina porrecta, Brady, 1879, etc., RRC, 1881, p. 57; 1884, FC, p. 418, pl. lii, fig. 22.
Bolivina (*Bifarina*) *porrecta*, Cushman, 1918, etc., FAO, 1922, p. 39, pl. vii, fig. 2.

Two stations: WS 408, 531.

A single good specimen of this common North Atlantic form at each station.

Sub-family *CASSIDULININAE*

Genus Cassidulina, d'Orbigny, 1826

157. **Cassidulina laevigata**, d'Orbigny.

Cassidulina laevigata, d'Orbigny, 1826, TMC, p. 282, no. 1, pl. xv, figs. 4, 5.
Cassidulina laevigata, Williamson, 1858, RFGB, p. 68, pl. vi, figs. 141, 142.
Cassidulina laevigata, Brady, 1884, FC, p. 428, pl. liv, figs. 1–3.

Twenty-eight stations: 48, 51, 53, 228, 230, 235, 236, 388; WS 71, 73, 77, 80, 83, 86, 87, 88, 89, 90, 97, 99, 215, 217, 221, 245, 248, 408, 409, 433.

Curiously rare and small at most stations, but becoming more common and larger at the stations to the north of the Falkland Islands. The best specimens and most numerous were found at 230, 235, 236 and WS 433, notably the last, where it was very common. Also at WS 86, 87 and 408 on the Burdwood Bank. The Paris Type is missing.

158. **Cassidulina pulchella**, d'Orbigny (Plate IX, figs. 19–21).

Cassidulina pulchella, d'Orbigny, 1839, FAM, p. 57, pl. viii, figs. 1–3.
Cassidulina pulchella, Cushman, 1927, FWCA, p. 166, pl. vi, fig. 1.

Thirteen stations: 388; WS 84, 86, 87, 88, 90, 91, 93, 95, 219, 245, 248, 408.

This is one of the species figured in d'Orbigny's *Amérique Méridionale*, but, curiously enough, he records it only from the Peruvian Coast, where it is, he says, "uncommon". How he can have failed to find it in the Falkland Islands material is not easily understood, as it is fairly generally distributed and quite typical. The best specimens occur at WS 86–88. At some of the other stations, notably WS 90, 93 and 95, the specimens are very small. D'Orbigny's figure is rather misleading, the peripheral edge showing a broken line due to the recurvature of the posterior edge of the chambers, but in our specimens, and in the Types in Paris, there is no sign of this, the periphery being rounded and unbroken.

159. **Cassidulina nitidula** (Chaster).

Pulvinulina nitidula, Chaster, 1892, FS, p. 66, pl. i, fig. 17.
Pulvinulina nitidula, Sidebottom, 1904, etc., RFD, 1909, p. 9, pl. iv, fig. 2.
Cassidulina nitidula, Heron-Allen and Earland, 1913, CI, p. 70, pl. v, figs. 6–9.

Two stations: 388; WS 88.

One specimen at 388 and two excellent specimens at WS 88. This little species appears to have a world-wide distribution, although owing to its small size it is probably often overlooked.

160. **Cassidulina crassa**, d'Orbigny (Plate IX, figs. 26–33).

Cassidulina crassa, d'Orbigny, 1839, FAM, p. 56, pl. vii, figs. 18–20.
Cassidulina crassa, d'Orbigny, 1846, FFV, p. 213, pl. xxi, figs. 42, 43.
Cassidulina crassa, Brady, 1884, FC, p. 429, pl. liv, figs. 4, 5.
Cassidulina crassa, Fauré-Fremiet, 1913–14, FMAF, 1913, p. 263, fig. 6 (*c*); 1914, p. 5, pl. O, fig. 7.

Forty stations: 48, 51, 228, 230, 236, 388; WS 71, 73, 76, 77, 78, 80, 83, 84, 86, 87, 88, 89, 90, 91, 92, 93, 95, 97, 98, 99, 108, 109, 210, 213, 217, 219, 221, 225, 245, 246, 248, 408, 409, 433.

Universally distributed and, at certain stations, forming a considerable proportion of the whole bulk of the material. The species is evidently polymorphic, as two, or perhaps three, very distinct forms occur at most of the stations in company. The first is a large form which is the true d'Orbignyan Type as verified in Paris, although it is much less delicate than his figure suggests, the markings being as a rule rather obscure (Plate IX, figs. 26–28, 32, 33). It agrees in size with the d'Orbignyan dimensions, "Diam. 1 mm." The test is thick-walled, opaquely white, the sutural lines nearly flush, sometimes quite invisible, the peripheral edge generally showing no lobulation. Sections reveal both megalo- and microspheric forms, there being little observable external difference, save as regards size, the microspheric form being larger than the megalospheric, and generally flatter.

The second form is quite small as compared with the foregoing, rarely attaining one-fifth of its dimensions (Plate IX, figs. 29–31). It is thin-walled, very hyaline and the chambering is clearly visible as in d'Orbigny's figure, the peripheral edge being slightly lobulate, as he describes it to be. We have not been able to cut sections of this form, but owing to certain differences in size and external characteristics which we have observed in a series of specimens, we have every reason to believe that both micro- and megalospheric specimens occur in this small form as well. This smaller form is the type which has been usually met with by us in gatherings practically all over the world. The large type on the other hand we have only met with in high latitudes both north and south, so it is presumably confined to colder waters.

A third form, which may be described as intermediate, is in size from three to four times the diameter of the small form, and partakes of the external characters of the large form, of which it is probably an immature or pauperate stage, though it is occasionally found at stations where the large form is not recorded, viz. 51 and WS 86, 89, 98, 213, 217, 225. At stations 228, 230, 236, and WS 95, 221, 408, 409, only the small form was found, and few and poor specimens at that. As these stations are widely separated, we can offer nothing in explanation.

161. **Cassidulina crassa** var. **porrecta**, var.nov. (Plate IX, figs. 34–37).

Eleven stations: 388; WS 76, 83, 84, 88, 89, 91, 93, 97, 210, 225.

At many of the stations where the large type of *C. crassa* occurs, there is a tendency to a form of variation characterized by the drawing out of the final chamber into a more or less produced terminal portion. The variation is unquestionably a form of senile deterioration, as it affects only the last few chambers of large and mature specimens. No young individuals with drawn-out final chambers were observed. Seen by itself the variety would be sufficiently striking to warrant a separate specific name, but there is no doubt that it is merely a local and senile variation. The best and most characteristic specimens occur at stations WS 83 and 91 and especially at 388. At first sight the variety recalls *Cassidulina braziliensis*, Cushman (C. 1918, etc., FAO, 1922, p. 130, pl. xxv,

figs. 4, 5) so far as his fig. 5 is concerned, but it appears to be quite distinct. *C. brasiliensis* has a thin and translucent wall with very clear sutures and its length is only 0·35–0·40 mm. as compared with an average 0·80 mm. in our variety which has thick, opaque walls and indistinct sutures. Length, 0·75–0·82 mm.; breadth, 0·60–0·62 mm.; thickness, 0·35 mm.

162. **Cassidulina subglobosa**, Brady.

Cassidulina subglobosa, Brady, 1879, etc., RRC, 1881, p. 60; 1884, FC, p. 430, pl. liv, fig. 17.
Cassidulina subglobosa, Chapman, 1907, TFV, p. 33, pl. iv, fig. 84.

Thirty-seven stations: 48, 51, 53, 235, 236, 388; WS 71, 72, 73, 76, 77, 80, 83, 84, 86, 88, 89, 90, 91, 92, 93, 97, 98, 99, 108, 109, 210, 213, 215, 217, 219, 221, 225, 245, 248, 408, 409.

Universally distributed, but never occurring in such numbers as *C. crassa*. The best stations are WS 73, 76, 90, 92, 99. The specimens are fairly true to type, but on the whole rather small. At a few stations a variety occurs characterized by a somewhat compressed, or less than ordinarily inflated test. It usually occurs in company with the type, but at WS 86 it occurs without the type.

163. **Cassidulina parkeriana**, Brady (Plate IX, figs. 22–25).

Cassidulina parkeriana, Brady, 1879, etc., RRC, 1881, p. 59; 1884, FC, p. 432, pl. liv, figs. 11–16.
Cassidulina parkeriana, Cushman, 1910, etc., FNP, 1911, p. 100, fig. 154.
Cassidulina parkeriana, Chapman, 1914, EDRS, p. 30, pl. ii, fig. 13.

Thirty stations: 48, 51, 53, 388; WS 71, 73, 76, 77, 79, 80, 83, 86, 87, 88, 90, 91, 92, 93, 97, 98, 99, 109, 210, 213, 215, 217, 219, 225, 245, 248.

Almost universally distributed, never very common, but, except for a few stations, always present in moderate numbers. In the area between Cape Horn and the Burdwood Bank (WS 83, 86, 87, 88, 91, 92, 93) the species reaches its optimum development in size and beauty. At most of the stations two very distinct forms are present, the megalospheric form which is shorter, stouter and with comparatively few chambers in the straight series, and the microspheric form which is much more delicately constructed, and with a long rectilinear series. The young specimens of this species before the adoption of the linear method of growth are by no means easy to separate from *C. subglobosa*.

Genus **Ehrenbergina**, Reuss, 1850

164. **Ehrenbergina pupa** (d'Orbigny) (Plate IX, figs. 40–47).

Cassidulina pupa, d'Orbigny, 1839, FAM, p. 57, pl. vii, figs. 21–3.
Ehrenbergina pupa, Brady, 1884, FC, p. 433, pl. cxiii, fig. 10 *a–c* (not pl. lvi, fig. 1).

Thirty stations: 48, 51, 236, 388; WS 71, 77, 79, 80, 83, 84, 86, 87, 88, 89, 90, 91, 92, 93, 97, 98, 210, 213, 215, 217, 225, 245, 246, 248, 408, 433.

Generally distributed, often very abundant. This typically Falkland Islands form is particularly rare elsewhere. In the Falkland Islands dredgings it occurs in great numbers, particularly at some of the stations, e.g. WS 83, 84, 87, 92, 93. At most of the stations there is considerable range of variation. D'Orbigny figures only a coarse triangular form. In the Falklands every range of variation is to be found, from short, broad, almost

sub-globular, to long and comparatively narrow individuals. It is probable that the extremes represent the micro- and megalospheric forms, and that the species is polymorphic. It may be noted that Brady's fig. 1 on pl. lvi, from a specimen from the Azores, certainly does not represent d'Orbigny's species. The d'Orbigny Types in Paris represent the long, adult form, the early stages not being represented.

165. **Ehrenbergina hystrix var. glabra**, Heron-Allen and Earland.

Ehrenbergina serrata, Chapman, 1914, FORS, p. 31, pl. ii, fig. 16 (only).
Ehrenbergina hystrix var. *glabra*, Heron-Allen and Earland, 1922, TN, p. 140, pl. v, figs. 1-6, 11.
Ehrenbergina hystrix var. *glabra*, Cushman, 1927, E, p. 4, pl. i, figs. 7, 8.

Two stations: 236; WS 79.

At these stations a few individuals with feebly spinous marginal edges were found, which we think should be attributed to the above. There is no doubt that they are merely spinous variations of the dominant local species *E. pupa*, and it would now seem probable to us that our variety is nearly related to that species and would have been more correctly placed as var. *spinosa* of *E. pupa*, than as var. *glabra* of *E. hystrix*.

166. **Ehrenbergina bradyi**, Cushman.

Ehrenbergina serrata, Brady (*pars*), 1884, FC, pl. lv, figs. 2, 3, 5 (?) not 4, 6, 7.
Ehrenbergina bradyi, Cushman, 1918, etc., FAO, 1922, p. 134, pl. xxvi, fig. 5.
Ehrenbergina bradyi, Cushman, 1927, E, p. 5, pl. ii, fig. 1.

One station: WS 88.

A single good specimen.

Family CHILOSTOMELLIDAE

Genus **Chilostomella**, Reuss, 1850

167. **Chilostomella oolina**, Schwager (Plate IX, figs. 38, 39).

Chilostomella oolina, Schwager, 1878, TDS, p. 528, pl. i, fig. 16.
Chilostomella ovoidea, Brady, 1884, FC, p. 436, pl. lv, figs. 14, 17, 18.
Chilostomella oolina, Cushman, 1925, LFR, 1, p. 74, pl. xi, figs. 3-10.

Four stations: 228, 230; WS 83, 408.

Two specimens at 230 and a single one at the remaining stations. It is rather curious that these four stations lie in the same area, and almost in a continuous line between the end of Staten Island and the southern extremity of the Falklands.

Genus **Seabrookia**, Brady 1890

168. **Seabrookia earlandi**, Wright (Plate X, figs. 1-3).

Seabrookia earlandi, Wright, 1891, SWI, p. 477, pl. xx, figs. 6, 7.
Seabrookia earlandi, Heron-Allen and Earland, 1913, CI, p. 72, pl. v, figs. 10-12.

One station: WS 83.

Two specimens. This little species has a curiously wide distribution. It is probably often overlooked owing to its small size.

Family LAGENIDAE

Sub-family *LAGENINAE*

Genus Lagena, Walker and Boys, 1784

169. **Lagena globosa** (Montagu).

Serpula (Lagena) laevis globosa, Walker and Boys, 1784, TMR, p. 3, pl. i, fig. 8.
Vermiculum globosum, Montagu, 1803–8, TB, 1803, p. 523.
Lagena globosa, Brady, 1884, FC, p. 452, pl. lvi, figs. 1–3.

Eighteen stations: 48, 51, 228, 236, 388; WS 71, 83, 88, 89, 90, 92, 93, 95, 221, 245, 248, 408, 433.

As usual, extremely variable, the best specimens at WS 83 and 88. The variation extends to the surface of the test which varies from a smoothly hyaline to a rough "matt" surface. Ento-ecto-solenian individuals at WS 83, 88. Practically all the forms of aperture figured by Brady (B. 1884, FC, p. 441) can be found among our specimens. There is a Type tube in Paris labelled *Entosolenia globosa*, from the Falkland Islands. This was probably added to the d'Orbigny collection at a later date as it is endorsed "Williamson, Britisch (*sic*) Forams. etc...." It contains a slightly compressed but otherwise typical *L. globosa*.

169A. **Lagena laevigata** (d'Orbigny) (Plate X, fig. 4).

Oolina laevigata, d'Orbigny, 1839, FAM, p. 19, pl. v, fig. 3.

One station: WS 248.

The single specimen which we figure has a solid conical neck of clear shell substance, and a basal stud of similar nature, both contrasting strongly with the milky white colour of the globular test. It is 0·50 mm. in length and 0·35 mm. in breadth. In spite of these dimensions we attribute our specimen to d'Orbigny's species which was described as "rare" in the Falkland Islands. It certainly agrees very well with d'Orbigny's description of his species—"un peu acuminée en avant, arrondie en arrière,...ouverture étroite, placée à l'extrémité d'un prolongement conique, et comme bordée par une partie plus transparent que le reste". D'Orbigny's description and figure, so far as the oral half is concerned, would very well correspond with our specimen. The agreement is not so complete as regards the basal portion, his figure having a line across the rounded base which suggests a *Glandulina*. But this may be an attempt to reproduce a solid basal stud such as our specimen possesses. The size of the original type is given as $\frac{1}{8}$ mm. diameter, the length not being stated. This is about a third of the size of our specimen.

There is a tube among the Paris Types labelled *Oolina laevigata*, "Îles Malouines", which does not represent the specimen from which d'Orbigny's figure was drawn. It is undoubtedly *Lagena globosa*, being quite globular, hyaline, at the oral and aboral extremities, but with a band of highly perforated shell substance surrounding its greater diameter and giving a false impression of a second chamber at the base.

The *Oolina laevigata* of d'Orbigny has in our opinion no zoological specific value, but is merely one of the many variations of the ubiquitous species *Lagena globosa* (Montagu).

D'Orbigny's name appears to have been entirely overlooked by subsequent authors as we cannot trace any reference to it. Most unfortunately the specific name *laevigata* was used by Reuss for a very different and ubiquitous species, and under the rules of priority *L. laevigata* Reuss must in future be abandoned (see No. 210).

170. Lagena compressa (d'Orbigny).

Oolina compressa, d'Orbigny, 1839, FAM, p. 18, pl. v, figs. 1, 2; 1846, FFV, p. 23, pl. xxi, figs. 1, 2.

One station: 48.

The species occurs at this station and almost certainly elsewhere. Having no very distinctive features, it was not separated from *L. marginata* until the last moment and after seeing the Type specimens in Paris. There are in Paris two separate Type tubes, one labelled *L. compressa*, with reference to FAM, endorsed. This specimen is entirely decomposed by acid degeneration of the glass, nothing but a chitinous film remaining, which suggests *L. orbignyana* or *L. bicarinata* or some other of the multi-keeled forms.

The other tube contains a single specimen, still in good preservation, of a turgid and almost keelless fissurine *Lagena* of the *L. marginata* group. It has no very distinctive features. D'Orbigny's figure exaggerates the keel—there is hardly any "keel" at all, but rather a thickened marginal edge to the shell, which, at the base, has a tendency to divide into two. It appears to have no specific value, but to be intermediate between *L. marginata*—the keelless type—and our species *L. revertens* (No. 238 *post*), which, however, has a pronounced neck.

171. Lagena stewartii, Wright.

Lagena stewartii, Wright, 1910–11, ECM, p. 12, pl. ii, fig. 8.
Lagena stewartii, Heron-Allen and Earland, 1913, CI, p. 81, pl. vi, figs. 2, 3.

Three stations: WS 88, 90, 245.

Occasional specimens at these, and probably at other stations. Wright's specific name, while probably having no zoological value, is useful for separating those specimens which have usually been recorded as "compressed" *L. globosa*. They are to be found wherever the type occurs.

172. Lagena ovum (Ehrenberg).

Miliola ovum, Ehrenberg, 1843, MMO, p. 166; 1854, M, pl. xxiii, fig. 2 (?); pl. xxvii, fig. 1; pl. xxix, fig. 45 (?); pl. xxxi, fig. 4.
Lagena ovum, Brady, 1884, FC, p. 454, pl. lvi, fig. 5.
Lagena ovum, Heron-Allen and Earland, 1913, CI, p. 73, pl. vi, fig. 1.

Two stations: WS 80, 83.

Good specimens at WS 83, where also what appears to be a compressed variety occurs. Ehrenberg's figures are all, with the exceptions of pl. xxvii, fig. 1, highly unsatisfactory, but the species is well identified by its specific name.

173. **Lagena botelliformis**, Brady.

Lagena botelliformis, Brady, 1879, etc., RRC, 1881, p. 60; 1884, FC, p. 454, pl. lvi, fig. 6.
Lagena botelliformis, Millett, 1898, etc., FM, 1901, p. 492, pl. viii, fig. 15.

Three stations: 228; WS 87, 433.

Rare and never very typical.

174. **Lagena apiculata** (Reuss).

Oolina apiculata, Reuss, 1851, FKL, p. 22, pl. i, fig. 1.
Lagena apiculata, Brady, 1884, FC, p. 453, pl. lvi, figs. 15, 16 (only).

Five stations: 228; WS 80, 83, 90, 92.

Extremely rare, seldom more than a single specimen at each station.

175. **Lagena inornata**, d'Orbigny (Plate X, fig. 5).

Oolina inornata, d'Orbigny, 1839, FAM, p. 21, pl. v, fig. 13.
Lagena inornata, Reuss, 1862, FFL, p. 320, pl. i, fig. 12.

Four stations: WS 83, 88, 89, 225.

The best at WS 88, where it was plentiful. It probably occurs at other stations where it was not separated from *L. globosa* or *L. apiculata*. We only record this species because it was originally described by d'Orbigny from the Falklands; it probably has no zoological value, the specimens passing gradually into *L. globosa* on the one hand and *L. apiculata* on the other. From d'Orbigny's description of the texture of the shell "son aspect est celui de verre dépoli", it would seem that his specimens were dead and worn shells. The Paris Type of *Oolina inornata* is hopelessly destroyed, but there is a tube obviously of later date than d'Orbigny labelled both "*Entosolenia marginata* var. *lucida* Will." and also "*Oolina inornata* F.A.M." It contains d'Orbigny's species and we have perfect metatypes from WS 88.

176. **Lagena elongata** (Ehrenberg).

Miliola elongata, Ehrenberg, 1844, *Ber. k. preuss. Ak. Wiss. Berlin*, p. 274; 1845, p. 371; 1854, M, pl. xxv, fig. 1 *A* 1.
Lagena elongata, Cushman, 1910, etc., FNP, 1913, p. 12, pl. i, fig. 5.

Two stations: 228; WS 217.

A single specimen at each station; that at 228 remarkably fine and large.

177. **Lagena gracillima** (Seguenza).

Amphorina gracilis, Costa, 1853, etc., PRN, 1856, p. 121, pl. xi, fig. 11.
Amphorina gracillima, Seguenza, 1862, FMMM, p. 51, pl. i, fig. 37.
Lagena gracillima, Brady, 1884, FC, p. 456, pl. lvi, figs. 19–28.

Three stations: WS 217, 225, 408.

The majority of the specimens at WS 217 and 225 are of the curious curved variety figured by Brady (1884) pl. lvi, figs. 20 and 24 (only). Straight specimens also occurred at WS 217.

178. **Lagena clavata** (d'Orbigny).

Oolina clavata, d'Orbigny, 1846, FFV, p. 24, pl. i, figs. 2, 3.
Lagena clavata, Reuss, 1862, FFL, p. 320, pl. i, fig. 13 (only).
Lagena clavata, Cushman, 1910, etc., FNP, 1913, p. 9, pl. ii, fig. 3.

Two stations: WS 89, 217.

Very rare but occurs typically at these stations, and quite conformable to the Paris Type which is of the rather pointed form.

179. **Lagena laevis** (Montagu).

Vermiculum laeve, Montagu, 1803–8, TB, p. 524.
Lagena laevis, Brady, 1884, FC, p. 455, pl. lvi, figs. 7, 8, 9, 12 (only).
Lagena laevis, Heron-Allen and Earland, 1913, CI, p. 77, pl. vi, fig. 5.

Seven stations: 48; WS 83, 86, 89, 90, 99, 225.

Curiously rare, as a rule only a single specimen at the stations where it occurs. Most frequent at WS 89 where, in addition to the type, the curved variety which we figured in 1913 (*ut supra*) is found. The same variety occurs at WS 86, where the type was not observed.

180. **Lagena hispidula**, Cushman (Plate X, fig. 6).

Lagena laevis, Brady (*pars*), 1884, FC, pl. lvi, figs. 10, 11.
Lagena hispidula, Cushman, 1910, etc., FNP, 1913, p. 14, pl. v, figs. 2, 3.

Six stations: WS 76, 88, 93, 215, 217, 433.

Very rare, usually only a single specimen at each station. Cushman founded his species on the two figures (10 and 11) of Brady's series of *L. laevis* in which the surface is "matt" or finely hispid. These Challenger specimens came from the Southern Ocean and the South Atlantic respectively. Cushman records it from many localities in the North Pacific. Length averages about 0·30 mm.

181. **Lagena hispida**, Reuss (Plate X, figs. 7, 8).

Lagena hispida, Reuss, 1858, FP, p. 434; 1862, FFL, p. 335, pl. vi, figs. 77–9.
Lagena hispida, Brady, 1884, FC, p. 459, pl. lvii, figs. 1–4; pl. lix, figs. 2–5.
Lagena hispida, Heron-Allen and Earland, 1916, FWS, p. 243, pl. xli, fig. 16.

Five stations: WS 76, 98, 210, 217, 225.

A few specimens at each. In dealing with *L. hispida* in 1916 (*ut supra*), we expressed our opinion that *L. hispida* is one of those species of *Lagena* with a compound shell structure, i.e. "the shell structure can be separated into distinctive layers. The internal layer is normally clothed with a dense 'pile' of most delicate needles, of equal length, their points coalescing to form a rough or 'matt' surface. The spirally ornamented neck is free from all exogenous growth. The 'matt' outer surface is very easily destroyed; the spines then fall off and only their bases are left, giving a faintly hispid surface to the test". We figured a British specimen showing this structure.

It is an interesting thing to have this observation confirmed by specimens from the other end of the world. The Falkland specimens of *L. hispida* are, however, different,

inasmuch as each of the delicate needles of the "pile" terminates in a triradial extension, over which, perhaps, an outer "skin" of shell substance was formed in life, the triradial terminations of the spines serving as its support (Plate X, fig. 7). The "pile" of needles is, of course, very fragile, but there is a complete range of specimens, from undamaged individuals to those on which only a few needles are left projecting (Plate X, fig. 8) from what would otherwise be normal *L. hispida* as figured by Brady (*ut supra*) (fig. 2). Length, 0·40–0·50 mm. Breadth of spinous specimen, 0·30 mm. Length of spines, about 0·02 mm.

182. **Lagena aspera**, Reuss.

Lagena aspera, Reuss, 1861, FKM, p. 305, pl. i, fig. 5.
Lagena aspera, Brady, 1884, FC, p. 457, pl. lvii, figs. 7–10.

Five stations: WS 88, 89, 90, 92, 99.

Rarely more than a single specimen, except at WS 89 and 99, where good specimens were found. They are all of a pronounced globular type without a produced neck. At WS 99, a specimen with the upper half smooth, suggesting the *Lagena balaniformis*, Heron-Allen and Earland of the Moorabool deposits (H.-A. & E. 1924, FQM, p. 147, pl. ix, figs. 30, 31) but with a greater proportion of the shell rough.

183. **Lagena lineata** (Williamson).

Entosolenia lineata, Williamson, 1848, BSGL, p. 18, pl. ii, fig. 18; 1858, RFGB, p. 9, pl. i, fig. 17.
Lagena lineata, Balkwill and Wright, 1885, DIS, p. 336, pl. xiv, figs. 13, 14.

Thirteen stations: WS 77, 83, 87, 88, 89, 90, 91, 92, 93, 99, 221, 225, 248.

Sometimes fairly common, the best at WS 88, 90 and 93. There is the usual range of variation in the coarseness of the markings, which vary from striae practically irresolvable under low magnifications to quite distinct costal lines. A complete range was observed at WS 93; at WS 92 all the specimens were coarsely, and at WS 88 all were feebly marked.

184. **Lagena caudata** (d'Orbigny) (Plate X, fig. 9).

Oolina caudata, d'Orbigny, 1839, FAM, p. 19, pl. v, fig. 6.
Lagena caudata, Reuss, 1862, FFL, p. 325, pl. iii, fig. 29.

Sixteen stations: 228; WS 76, 79, 80, 83, 89, 90, 91, 92, 93, 95, 98, 217, 221, 225, 408.

This little form which d'Orbigny described from the Falkland Islands as "pretty rare" occurs at a good many stations, often in considerable numbers. It appears to be a true local variation, for we cannot recall having seen it elsewhere, and the records are few and doubtful. At the same time it has probably no zoological value, for even in the Falkland area it is quite easy to obtain transition forms linking it with *L. gracilis* and *L. distoma*. But for the Falkland area, *L. caudata* remains a fitting name for those striate, or fully sulcate *Lagenae* characterized by a rapid diminution of the aboral end to a more or less produced spine or tube. The best specimens at WS 83 and 217. Length

averages 0·50 to 0·60 mm. In the Paris Type the striae are clearly marked over the whole length of the shell as in d'Orbigny's figure; but there is often considerable variation in the strength and extent of the striae even among specimens from the same station.

185. **Lagena gracilis, Williamson.**

Lagena gracilis, Williamson, 1848, BSGL, p. 13, pl. i, fig. 5; 1858, RFGB, p. 7, pl. I, figs. 12, 13.
Lagena gracilis, Brady, 1884, FC, p. 464, pl. lviii, figs. 2, 3, 7, 8, 9, 19, 23.

Fifteen stations: 228, 230, 235, 236; WS 80, 83, 89, 92, 210, 215, 217, 221, 225, 248, 408.

Frequent and variable. At many of the stations it seems to run into *L. caudata*, d'Orbigny, and at others into *L. distoma*, Parker and Jones. At WS 217, where the best range of specimens occurred, everything intermediate between these species could be found. Coarsely costate specimens at 235 and WS 221. The most typical at 230 and 235 and WS 83, 225, 248.

186. **Lagena distoma, Parker and Jones.**

Lagena distoma, Brady, 1864, RFS, p. 467, pl. xlviii, fig. 6; 1884, FC, p. 461, pl. lviii, figs. 11–15.
Lagena distoma, Cushman, 1918, etc., FAO, 1923, p. 14, pl. iii, fig. 3 (only).

Ten stations: 228, 236; WS 76, 80, 98, 109, 210, 217, 248, 433.

Never very common and never attaining the large dimensions which it sometimes reaches, notably in the North Sea. Very good and typical specimens are found at 236 and WS 217. [At Cushman's reference (*ut supra*) fig. 2 is a reproduction of our figure (H.-A. & E. 1913, CI, pl. vi, fig. 6) of *L. laevis* var. *distoma*, Silvestri, an entirely different form.]

187. **Lagena perlucida, Williamson.**

Lagena vulgaris var. *perlucida*, Williamson, 1858, RFGB, p. 5, pl. i, figs. 7, 8.
Lagena perlucida, Heron-Allen and Earland, 1908, etc., SB, 1911, p. 320, pl. x, fig. 13.

Seven stations: WS 83, 89, 92, 93, 225, 248, 408.

Often numerous, especially at WS 83 and 92. Some specimens approach *L. striaticollis* (d'Orbigny) in the development of minute basal spines arising from the costae. The Type of *Oolina striaticollis* could not be found in Paris.

188. **Lagena striata (d'Orbigny) (Plate X, figs. 10–12).**

Oolina striata, d'Orbigny, 1839, FAM, p. 21, pl. v, fig. 12.
Lagena vulgaris var. *substriata*, Williamson, 1858, RFGB, p. 7, fig. 14.
Lagena striata, Brady, 1884, FC, p. 460, pl. lvii, figs. 22, 24, 28, 29, etc.

Nineteen stations: 51, 228, 236; WS 79, 80, 83, 88, 89, 90, 91, 92, 93, 99, 210, 215, 217, 225, 408, 433.

The *Oolina striata* of d'Orbigny is described as from the Falkland Islands, where it is rare. D'Orbigny's Type is globular, covered with a great number of very fine striae. Typical specimens occur at seven stations only, the best being at WS 89, 215, 225. At these stations the globular form only is present; at other stations the globular form

occurs in company with the much commoner elongated type, first figured by Williamson (*ut supra*) which is dominant at most of the stations. Particularly good at WS 89 and 217. The dimensions vary considerably. Three typical specimens of the d'Orbigny type were, respectively, 0·40, 0·50 and 0·55 mm. long, and 0·26, 0·26 and 0·33 mm. broad.

189. **Lagena sulcata** (Walker and Jacob) (Plate X, figs. 13–15).

Serpula (Lagena) striata, Walker and Boys, 1784, TMR, p. 2, pl. i, fig. 6.
Serpula (Lagena) striata, Walker and Jacob, 1798, AEM, p. 634, pl. xiv, fig. 5.
Lagena sulcata, Brady, 1884, FC, p. 462, pl. lvii, figs. 23, 26, 33, 34.

Twenty-one stations: 51, 228, 235, 236, 388; WS 71, 79, 83, 88, 89, 90, 91, 92, 210, 213, 221, 225, 245, 248, 408, 433.

Generally distributed but never very common, and very variable both in the number and development of the costae. At WS 83, 221, 225 and 408, a very curious variety occurs characterized by a long neck, a basal "peg" and a small number (about 12) of very thin but strongly developed costae (Plate X, fig. 13). In a few perfect specimens found at WS 83, every third "costa" is extended in a straight flange up the neck (Plate X, fig. 14), but, as a rule, this delicate ornament is broken away so that in most of the specimens the costae are confined to the globular body. A somewhat similar form is figured by Sidebottom (S. 1912, etc., LSP, 1913, p. 173, pl. xv, fig. 24) who compared his specimen with *L. alifera*, Reuss (R. 1870, FSP, p. 467, v. S. 1870, FSP, pl. iii, figs. 15, 16, 21, 22). This variety usually represents the species in the stations mentioned above. At WS 91 and 245, single specimens of a very extraordinary form, 0·43 mm. long, 0·22 mm. broad, in which alternate costae are continued and form prominent flanges running straight up the neck. The flanges are bridged by annular outgrowths forming a ladder-like structure up the neck (Plate X, fig. 15). At 228 and WS 225, the costae are extended almost into wings.

190. **Lagena lyellii** (Seguenza).

Amphorina lyellii, Seguenza, 1862, FMMM, p. 52, pl. i, fig. 40.
Lagena lyellii, Balkwill and Millett, 1884, FG, p. 27, pl. ii, fig. 2.
Lagena lyellii, Heron-Allen and Earland, 1913, CI, p. 79, pl. vi, fig. 8.

Six stations: 388; WS 83, 89, 93, 221, 245.

Usually only a single specimen, but with some variation in the strength of the costae.

191. **Lagena vilardeboana** (d'Orbigny) (Plate X, figs. 16–18).

Oolina vilardeboana, d'Orbigny, 1839, FAM, p. 19, pl. v, figs. 4–5.

Nineteen stations: 48, 51, 53, 388; WS 71, 79, 80, 83, 88, 89, 90, 91, 92, 93, 95, 99, 225, 245, 408.

D'Orbigny's species has hitherto been regarded as a synonym for *L. sulcata* and as representing a short-necked variety of that species, a view justly based on the original figure and description, which merely describes a shell with 20–25 well-marked costae.

But an examination of the Types in Paris disclosed three specimens mounted in the usual tube. One may be summarily dismissed—it is a specimen of *L. squamosa* (Montagu). How and when it became associated cannot now be stated. The other two specimens, while agreeing in general form with d'Orbigny's figure, differ from it in the

possession of an ornament round the neck which d'Orbigny either failed to notice or could not see with the magnifications at his disposal. They agree with a form which is very generally distributed in the Falkland area, indeed often the commonest species of *Lagena*.

D'Orbigny's figure and the subsequent figures of Reuss (R. 1862, FFL, p. 329, pl. iv, fig. 53; R. 1863, FCA, p. 144, pl. i, fig. 15) must therefore be discarded as misleading representations of the type which he intended to figure, and d'Orbigny's original description of *L. vilardeboana* "ovale, très renflée, arrondie en arrière, un peu acuminée en avant, ornée en long de vingt à vingt-sept côtes saillantes très prononcées; ouverture ronde, placée à l'extrémité d'un prolongement médiocre. Couleur blanc uniforme" will require to be supplemented with the words "the costae merge round the neck and form a solid collar of shell substance which is covered with fine pitted depressions". We figure some typical specimens.

These depressions on the collar mark the very close affinity of d'Orbigny's species to *L. williamsoni* (Alcock). The two forms differ indeed only in the greater number of costae and the greater number and much smaller size of the depressions in the Falkland form. As the older species, *L. vilardeboana* must become the type of the costate Lagenae with hexagonal neck ornament, and *L. williamsoni* must be regarded as a more strongly marked variety of it.

L. vilardeboana is widely distributed in the area and very often abundant. The best stations are WS 88, 90, 92, 93, 245. The species is very variable in the number and acuteness of the costae, and at several stations, notably WS 93, there is a complete gradation between *L. vilardeboana* and *L. williamsoni*. On the other hand, there are several stations at which it occurs to the exclusion of *L. williamsoni*.

Average length, 0·40 mm.; breadth 0·22 mm.

192. **Lagena williamsoni** (Alcock) (*non* Harvey and Bailey).

[NOTE. In 1853, W. H. Harvey and J. W. Bailey published a description in Latin (*Proc. A. Nat. Sci. Philadelphia*, v. (1854), p. 431) of an organism under the name of *Lagena williamsoni*, which is clearly a *Nodosaria*, species problematical, but possibly *scalaris* (Batsch). We do not propose to interfere with the use of a name, which has been universally used for over half a century in favour of an incorrect diagnosis unaccompanied by any figure.]

Entosolenia williamsoni, Alcock, 1865, NHC, p. 195.
Lagena williamsoni, Wright, 1877, RFDA, p. 104, pl. iv, fig. 14.
Lagena williamsoni, Cushman, Stewart and Stewart, 1930, TFNC, p. 59, pl. viii, fig. 5.

Fourteen stations: 48, 51; WS 76, 80, 83, 89, 92, 93, 97, 99, 210, 217, 225, 248.

This very common British type, characterized by a pyriform shell which is decorated with 12–18 well-marked costae, merging into a collar of hexagonal ornament round the neck, is well distributed in the Falkland area, though never so abundant as *L. vilardeboana* (d'Orbigny). The best specimens were recorded at WS 217, 248, where it was the only type and at WS 92, 93, where the two forms occurred together with intermediate links.

193. **Lagena isabella**, d'Orbigny.

Oolina isabella, d'Orbigny, 1839, FAM, p. 20, pl. v, figs. 7, 8. (*O. isabelleana* on plate and in index.)
Lagena isabella, Reuss, 1862, FFL, p. 330, pl. iv, figs. 55, 56.

One station: WS 408.

It occurs probably at many other stations. The specimens have more numerous costae than in d'Orbigny's figure. It is an intermediate form between *L. sulcata* and *L. costata*, of no zoological value; and we merely record it because it was originally described by d'Orbigny from the Falkland Islands. The Paris Type tube contains seven specimens of no dominant character, the costae ranging in number from 8 to 10, giving us intermediate forms between *L. costata* and *L. sulcata*.

194. **Lagena raricosta** (d'Orbigny).

Oolina raricosta, d'Orbigny, 1839, FAM, p. 20, pl. v, figs. 10, 11.

One station: WS 408.

A single specimen, longer than d'Orbigny's figure suggests, but it agrees in the number of costae. D'Orbigny's name has no specific value, his species represents merely an intermediate variety like *L. isabella*. The Type of *L. raricosta* is missing.

195. **Lagena costata** (Williamson) (Plate X, figs. 19–24).

Entosolenia costata, Williamson, 1858, RFGB, p. 9, pl. i, fig. 18.
Lagena costata, Reuss, 1862, FFL, p. 329, pl. iv, fig. 54.
Lagena costata, Balkwill and Wright, 1885, DIS, p. 338, pl. xiv, figs. 3–5.

Twenty-two stations: 51, 235, 236, 388; WS 71, 83, 86, 88, 89, 90, 91, 92, 93, 97, 210, 213, 217, 221, 225, 245, 248, 408.

One of the most abundant *Lagenae* of the area, very variable, practically every variation in the number and strength of the costae being observed, and it would be possible to split up the specimens into a number of so-called species. It is best and most abundant at WS 83, 86.

196. **Lagena acuticosta**, Reuss.

Lagena acuticosta, Reuss, 1862, FFL, p. 331, pl. v, fig. 63.
Lagena acuticosta, Brady, 1884, FC, p. 464, pl. lvii, figs. 31, 32; pl. lviii, figs. 20, 21.

Seventeen stations: 48, 236, 388; WS 71, 80, 83, 84, 86, 87, 88, 91, 92, 93, 95, 97, 225, 248.

Large and very handsome specimens occur, especially at 48, WS 87, 88, 248. They all belong to the "collared" type figured by Brady (fig. 31) except at WS 91 and 225, where a few typical specimens also occurred.

196A. **Lagena squamoso-sulcata**, Heron-Allen and Earland.

Lagena melo (intermediate variety), Brady, Parker and Jones, 1888, AB, p. 237, pl. xliv, fig. 25.
Lagena squamoso sulcata, Heron-Allen and Earland, 1922, TN, p. 151, pl. v, figs. 15, 19.

One station: 388.

A single good specimen.

197. **Lagena squamosa** (Montagu).

Vermiculum squamosum, Montagu, 1803–8, TB, p. 526, pl. xiv, fig. 2.
Lagena squamosa, Brady, 1884, FC, p. 471, pl. lviii, figs. 28–31.

Seventeen stations: 48, 51, 388; WS 78, 80, 83, 86, 87, 88, 89, 92, 93, 99, 217, 221, 245, 248.

Never very abundant and, as might be expected, the species often varies in the direction of *L. melo*, one of d'Orbigny's local species. At different stations there is often a great difference in the size of the markings. At 51 they are all very coarse, at WS 89 all very small, but at WS 80 there is a complete range between coarsely and finely marked specimens. The best and most typical at WS 86 and 93.

198. **Lagena squamosa var. montagui** (Alcock).

Entosolenia montagui, Alcock, 1865, NHC, p. 196.
Lagena squamosa var. *montagui*, Heron-Allen and Earland, 1913, CI, p. 76, pl. vii, fig. 13.

Two stations: WS 92, 245.

A single specimen at each. That from WS 245 has the depressions arranged spirally round the shell.

199. **Lagena reticulata** (Macgillivray).

Lagenula reticulata, Macgillivray, 1843, HMAA, p. 38.
Lagena reticulata, Reuss, 1862, FFL, p. 333, pl. v, figs. 67, 68; 1863, FCA, p. 144, pl. i, fig. 16.

One station: WS 225.

Represented by a single specimen.

200. **Lagena melo** (d'Orbigny) (Plate X, figs. 25–27).

Oolina melo, d'Orbigny, 1839, FAM, p. 20, pl. v, fig. 9.
Entosolenia squamosa var. *catenulata*, Williamson, 1848, BSGL, p. 19, pl. ii, fig. 20; 1858, RFGB, p. 13, pl. i, fig. 31.
Lagena melo, Brady, Parker and Jones, 1888, AB, p. 222, pl. xliv, fig. 21 (only).

Fifteen stations: 48, 388; WS 71, 73, 83, 89, 90, 91, 97, 99, 210, 221, 225, 245, 248.

This is one of d'Orbigny's species from the Falklands, and although there is a good deal of variation in the shape of the specimens and in the number of the "rows of dimples" (*fossettes en ligne*) which he describes, yet at many stations perfectly typical examples can be found, notably at WS 73, 90 and 97. The specimens have been compared with the Types in Paris and are identical. Size very variable, up to 0·25 mm. long, 0·20 mm. broad.

201. **Lagena catenulata**, Reuss.

(Not *Entosolenia squamosa* var. *catenulata*, Williamson, 1848, BSGL, p. 19, pl. ii, fig. 20.)
Lagena catenulata, Reuss, 1862, FFL, p. 332, pl. vi, fig. 75 (only).
Lagena catenulata, Heron-Allen and Earland, 1922, TN, p. 152, pl. v, figs. 16–18.

Three stations: WS 93, 248, 433.

Very rare but good specimens. Although Reuss's figure purports to represent *L. catenulata*, Will., it is in our opinion quite a distinct form, and as such we have separated it.

The question as to whether Reuss's figure can be known as *L. catenulata*, Reuss, Williamson's early form *L. catenulata* being regarded as a synonym of *L. melo*, is one of those controversial points to which we are not inclined to devote our attention or studies.

202. **Lagena hexagona** (Williamson).

Entosolenia squamosa var. *hexagona*, Williamson, 1848, BSGL, p. 20, pl. ii, 32, fig. 23; 1858, RFGB, p. 13, pl. i, fig. 32.
Lagena hexagona, Brady, 1884, FC, p. 472, pl. lviii, figs. 32, 33.

Four stations: 236; WS 221, 248, 408.

Only a few specimens at each station, but very fine and typical.

203. **Lagena digitale**, sp.n. (Plate X, figs. 28–30).

Two stations: WS 89, 90.

Test an oval flask with produced neck almost as long as the body, The whole surface, including the neck, covered with small pits resembling those upon a thimble. The depressions run more or less regularly in vertical lines but cannot be confounded with the markings of any species of the *L. hexagona* group. The presence of the long neck indicates an affinity with the *L. laevis* group. The species is a very striking one, quite distinct from anything with which we have hitherto been acquainted.

Several specimens at WS 89 and a few at WS 90, both of which are close to the South American coast. Size and shape of test rather variable. Three specimens measured were 0·46, 0·37 and 0·38 mm. long, and 0·25, 0·20 and 0·22 mm. broad respectively.

204. **Lagena foveolata**, Reuss.

Lagena foveolata, Reuss, 1862, FFL, p. 332, pl. v, fig. 65.
Lagena foveolata, Millett, 1898, etc., FM, 1901, p. 11, pl. i, fig. 15.

Two stations: WS 408, 433.

One very fine specimen at each station.

205. **Lagena spumosa**, Millett.

Lagena spumosa, Millett, 1898, etc., FM, 1901, p. 9, pl. i, fig. 9.
Lagena spumosa, Heron-Allen and Earland, 1916, FWS, p. 245, pl. xli, figs. 19, 20.

Two stations: 228; WS 408.

A few very good specimens at 228 and several at WS 408.

206. **Lagena protea**, Chaster.

Lagena protea, Chaster, 1892, FS, p. 62, pl. i, fig. 14.
Lagena protea, Sidebottom, 1904, etc., RFD, 1906, p. 15, pl. ii, fig. 18; 1912, etc., LSP, 1912, p. 247.
Lagena protea, Heron-Allen and Earland, 1913, CI, p. 74, pl. vii, figs. 19, 20.
Lagena hispidipholus, Pearcey, 1914, SNA, p. 1020, pl. ii, figs. 11–13.

Three stations: 388; WS 83, 88.

Two small specimens at WS 83 and two large ones at 388 and WS 88 respectively, all similar to the British type of this "protean" organism.

207. **Lagena cymbula**, Heron-Allen and Earland.

Lagena cymbula, Heron-Allen and Earland, 1913, CI, p. 90, pl. vii, figs. 16–18.
Lagena cymbula, Heron-Allen and Earland, 1913, NSII, p. 129, pl. x, figs. 10–12.

Two stations: 388; WS 93.

A single typical specimen at each station. Its occurrence so far from the locus of origin, and the only records in British Seas, is noteworthy.

208. **Lagena reniformis**, Sidebottom (Plate X, figs. 31, 32).

Lagena reniformis, Sidebottom, 1912, etc., LSP, 1913, p. 204, pl. xviii, figs. 14, 15.
Lagena reniformis, Heron-Allen and Earland, 1916, FWS, p. 255, pl. xli, figs. 30–4.

Two stations: WS 87, 93.

A few, but quite typical specimens. The species, though always rare, is widely distributed.

Length, 0·12 mm.; breadth, 0·16 mm.; thickness, 0·08 mm.

209. **Lagena millettii**, Chaster (Plate X, figs. 33, 34).

Lagena millettii, Chaster, 1892, CS, p. 61, pl. i, fig. 10.
Lagena millettii, Heron-Allen and Earland, 1913, CI, p. 83, pl. vi, fig. 10.

Five stations: 388; WS 71, 88, 92, 408.

A few specimens only. At WS 71 and 408, sharp-edged (length, 0·20 mm., breadth, 0·10 mm.), at WS 88 both sharp and round-edged, at WS 92, sharp-edged (length, 0·19 mm.; breadth, 0·13 mm.), and with a semicircular terminal hood instead of the circular hood characteristic of the other specimens, which agree in this respect with Chaster's type in our collection.

210. **Lagena biancae** (Seguenza) (Plate X, figs. 35–39).

Fissurina laevigata, Reuss, 1849–50, FOT, p. 366, pl. i (xlvi), fig. 1.
Lagena laevigata, (Reuss *non* d'Orbigny) of subsequent authors.
Fissurina biancae, Seguenza, 1862, FMMM, p. 57, pl. i, figs. 48–50.
Fissurina biancae, A. Silvestri, 1902, LMT, p. 20, figs. 29–32.

Twenty-eight stations: 48, 51, 228, 236, 388; WS 71, 76, 79, 80, 83, 86, 87, 88, 90, 91, 92, 93, 97, 98, 99, 215, 217, 221, 225, 245, 248, 408, 409.

It is unfortunate that a specific name so long and generally recognized as *Lagena* (*Fissurina*) *laevigata* (Reuss) should have to be abandoned, but under the law of priority this is inevitable, d'Orbigny having employed the specific name for a different organism (see No. 169 A). The selection of an alternative name has not been easy and, although we have devoted some time to a search of the literature prior to 1862, it is quite possible that we have overlooked some species having a prior claim to *Fissurina biancae*, Seguenza, which we have selected as an alternative name.

Some earlier specific names were considered and dismissed for various reasons.

Fissurina alata, Reuss, 1851, has a pronounced carina being intermediate between *Lagena laevigata* and *L. marginata*. *Fissurina globosa*, Bornemann, 1855, is merely an inflated form of *F. laevigata* and the two can be connected by intermediate variations. It might have been accepted as an alternative. But again priority of publication intervenes, Bornemann's specific name having been used much earlier by Montagu (see No. 169).

Seguenza (S. 1862, FMMM) figured and described a long series of fissurine *Lagenae*, many of which are but forms of *Lagena laevigata* (Reuss), an extremely variable species. It appears therefore to be a case of selecting the earliest suitable specific name from his monograph. The first two species *Fissurina solida* and *F. rugosula* may be disregarded. They are too inflated for our purpose, and the surface of the test is described as rather rough, or rough, though the figures do not convey that impression to any extent. The next species *Fissurina simplex* would be very suitable for our requirements, but again priority intervenes, both Reuss (1851) and Terquem and Berthelin (1862) having used the specific name for two distinct forms. *Fissurina deltoidea* and *F. latistoma* which follow do not conform to requirements, but the sixth species *Fissurina biancae* bears a close resemblance, both in figure and description, to *Fissurina laevigata*, Reuss, and we have accordingly selected it to supersede that species.

Universally distributed and often very abundant. At WS 83, it exhibits practically all the variations found elsewhere in the area. Besides the typical Reuss form there are others, notably a strongly punctate form. Such punctation is one of the most constant features of the species in the Falkland area. This particular form, which is very variable in size, good specimens averaging 0·30 mm. in length, 0·25 in breadth, presents two sub-variations; in the first, the punctation is uniform all over the shell, in the second it is confined to the marginal area, the central area being hyaline and clear. Another variety is characterized by a limited number of much coarser perforations which may either be irregularly disposed, or arranged in lines upon the surface. The marginal edge varies enormously, from the acute angle of the type to a narrow, sharply produced keel in the one direction, and, in the other, to a bluntly rounded edge. A small variety common at WS 83 and occurring at several others is characterized by a roughly "matt" surface *not* due to the decomposition of the shell.

The aperture is normally fissurine, but hooded specimens, otherwise absolutely identical with the fissurine, are found here and at several other stations. A remarkably fine trigonal specimen was found at WS 83 (Plate X, fig. 39).

211. Lagena acuta (Reuss).

Fissurina acuta, Reuss, 1858, FP, p. 434; 1862, FFL, p. 340, pl. vii, figs. 90, 91.
Lagena acuta, Cushman, 1910, etc., FNP, 1913, p. 6, pl. xxxviii, fig. 6.

Thirteen stations: 48; WS 71, 76, 80, 83, 86, 87, 88, 90, 92, 210, 245, 248.

Fissurine *Lagenae* with pointed bases occur rarely at many of the stations, but no very typical specimens were found. The best were at WS 88 and 210. At WS 83, a specimen was seen with two basal spines.

212. **Lagena fasciata** (Egger).

Oolina fasciata, Egger, 1857, MSO, p. 270, pl. i (v), figs. 12–15.
Lagena fasciata, Millett, 1898, etc., FM, 1901, p. 495, pl. viii, fig. 19.

Six stations: 48; WS 80, 83, 90, 92, 93.

Occurs very infrequently as compared with the feebler type *L. annectens*, but occasional good and typical individuals were found, the best being at WS 80 and 90.

213. **Lagena fasciata** var. **faba**, Balkwill and Millett.

Lagena faba, Balkwill and Millett, 1884, FG, p. 81, pl. ii, fig. 10.
Lagena faba var. *fasciata*, Balkwill, and Millett, 1908, FG (reprint), p. 6, pl. ii, fig. 10.
Lagena faba var. *fasciata*, Heron-Allen and Earland, 1913, CI, p. 84.

Two stations: WS 71, 83.

A single specimen at each station.

214. **Lagena lucida** (Williamson).

Entosolenia marginata var. *lucida*, Williamson, 1858, RFGB, p. 10, pl. i, figs. 22, 23.
Lagena lucida, Sidebottom, 1904, etc., RFD, 1906, p. 6, pl. i, figs. 9–12.

Five stations: 48; WS 83, 87, 248, 408.

Only a few specimens at each station, but absolutely typical.

215. **Lagena annectens**, Burrows and Holland (Plate X, figs. 40–44).

Lagena annectens, Burrows and Holland, in Jones, Parker and Brady, 1866, etc., MFC, 1895, p. 203, pl. vii, fig. 11.
Lagena annectens, Heron-Allen and Earland, 1914, etc., FKA, 1915, p. 662.
Lagena annectens, Fornasini, 1901, NNI, p. 50, text-fig. 4.

Thirteen stations: 388; WS 71, 83, 87, 88, 89, 91, 93, 97, 215, 217, 248, 408.

Moderately frequent. This is the most abundant species of a little group, the members of which are zoologically inseparable though they have been differentiated according to the varying prominence or strength of the crescentiform surface markings. They would perhaps have all been described under the senior specific name *L. fasciata*, Egger, but typical specimens of that species are comparatively infrequent in the Falkland material.

The specimens referable to *L. annectens* are themselves subject to considerable variation. Apiculate forms are comparatively common, and the worthlessness of this feature as a specific, or even varietal difference, is illustrated by our specimens, which vary from a mere basal thickening to a strongly produced spine (Plate X, fig. 43). Doubly apiculate specimens are by no means infrequent. At many stations, notably WS 71, 87 and 93, many of the specimens are ornamented with opaque spots in the glassy central portion of the shell. These appear to be lacunae, but whether natural or due to some parasitic growth we cannot say. There is great difference in the inflation of the shell; in some the specimens are very thin with parallel faces, some are so inflated as to be semi-globular.

The size varies greatly, averaging up to 0·40 mm. in length, 0·25 mm. in breadth.

216. **Lagena quadricostulata**, Reuss.

Lagena quadricostulata, Reuss, 1870, FSP, p. 409; von S. 1870, FSP, pl. iv, figs. 25–30.
Lagena quadricostulata, Brady, 1884, FC, p. 486, pl. lix, fig. 15.

Three stations: 228; WS 88, 408.

Typical specimens are very rare but occur at 228 and WS 408, at which latter station a trigonal specimen was also found. At WS 88, a curious variety almost quadrate in shape and very compressed occurred.

217. **Lagena malcomsonii**, Wright.

Lagena laevigata var. *malcomsonii*, Wright, 1910–11, BCNI, p. 4, pl. i, figs. 1, 2.
Lagena malcomsonii, Heron-Allen and Earland, 1913, CI, p. 84, pl. vi, fig. 9.

Ten stations: 228, 388; WS 83, 86, 89, 91, 92, 93, 221, 245.

More generally distributed and more abundant than the sharp-edged *L. quadrata*, the best occurring at WS 88 where *L. quadrata* was also conspicuous. At the other two stations where *L. quadrata* was conspicuous, *L. malcomsonii*, though represented, was poorly developed.

218. **Lagena quadrata** (Williamson).

Entosolenia marginata var. *quadrata*, Williamson, 1858, RFGB, p. 11, pl. i, fig. 27.
Lagena quadrata, Balkwill and Millett, 1884, FG, p. 81, pl. ii, fig. 8.
Lagena quadrata, Sidebottom, 1904, etc., RFD, 1906, p. 8, pl. i, figs. 21, 22, pl. ii, figs. 1–3.

Six stations: 388; WS 83, 88, 93, 221, 245.

Often common, the best stations being WS 88, 93 and 221.

219. **Lagena quadrata var. bispinosa**, var.n. (Plate XI, figs. 1, 2).

Two stations: WS 88, 245.

Test typically compressed and quadrate, furnished with a long entosolenian tube extending down one side of the shell and up the other nearly to mid-way of the shell. Furnished at the basal corners with two stiff, short, projecting spines, which appear to be solid extensions of the side-walls of the test. Two specimens at WS 88 and one at WS 245. In those from the first station the basal spines are extensions of the margin. In that from WS 245, they are extended outwards at an angle of 45°.

Length of test, without spines, between 0·18 and 0·20 mm.; breadth, 0·13 mm.

The specimens strongly suggest our species *L. forficula* (H.-A. & E., 1913, CI, p. 87, pl. vi, fig. 11), which differs by the fact that that species has a rounded periphery and a long produced neck, with a hooked apertural end, and slightly incurving basal spines, suggesting its specific name.

220. **Lagena uncinata**, sp.n. (Plate XI, fig. 3).

One station: WS 93.

Test free, highly compressed, marginal edge acute but not carinate. Quadrate in form, the corners of the aboral end rounded off, the oral end produced into a curved

flat wing, furnished at the extremities with sharp hooks, which do not extend backwards beyond the wing. Aperture fissurine, with a short entosolenian tube.

Length, 0·17 mm. Greatest breadth, at hooks, 0·14 mm.

A single specimen. This very distinctive form bears a striking resemblance to No. 262, *Lingulina falcata*, a new species from the Falkland Islands, and was at first regarded as an immature stage of that species. But such can hardly be the case, as the hooks in *Lingulina falcata* are confined to the second chamber and would not appear on the first chamber, unless we are to suppose that they are formed and then resorbed.

Its nearest ally in the genus *Lagena* would be *L. falcata*, Chaster (C. 1892, S, p. 61, pl. i, fig. 7), which species, however, is characterized by a thick and solid neck, furnished with recurved hooks. The body of that species is also much less compressed.

221. **Lagena marginata** (Walker and Boys).

Serpula (Lagena) marginata, Walker and Boys, 1784, TMR, p. 2, pl. i, fig. 7.
Lagena marginata, Brady, 1884, FC, p. 476, pl. lix, figs. 21–3.

Twenty-three stations: 48, 51, 236, 388; WS 71, 77, 80, 83, 84, 86, 87, 88, 89, 90, 91, 92, 93, 97, 99, 215, 245, 248, 408.

Often very abundant, the best at WS 88, at which station there was a considerable range in the width of the marginal carina. As a general rule the carinae of the Falkland area specimens are very poorly developed, often no more than a mere indication. At WS 71, 88, 91, 92, a few specimens occur with coarse punctations scattered irregularly over the test in addition to the ordinary fine punctation; this gives a spotted appearance to the test. A similar characteristic was noted in connection with *L. laevigata* (No. 210).

222. **Lagena marginata var. semimarginata**, Reuss.

Lagena marginata var. *semimarginata*, Reuss, 1870, FSP, p. 468; Schlicht, 1870, FSP, p. 11, pl. iv, figs. 4–6, 10–12.
Lagena marginata var. *semimarginata*, Brady, 1884, FC, p. 477, pl. lix, figs. 17–19.
Lagena marginata var. *semimarginata*, Millett, 1898, etc., FM, 1901, p. 619, pl. xiv, fig. 1.

Two stations: WS 210, 217.

Some very good specimens at these stations. It is probably widely distributed, but has escaped attention owing to its similarity to some of the local variations of *L. laevigata*.

223. **Lagena unguis**, Heron-Allen and Earland.

Lagena unguis, Heron-Allen and Earland, 1913, CI, p. 86, pl. vii, figs. 1–3; 1913, FNS, p. 135; 1916, FSC, p. 46.
Lagena unguis, Cushman, 1918, etc., FAO, 1923, p. 60, pl. xi, fig. 7.

Two stations: WS 88, 92.

Several good specimens at WS 88 and one at WS 92.

224. **Lagena staphyllearia** (Schwager).

Fissurina staphyllearia, Schwager, 1866, FKN, p. 209, pl. v. fig. 24.
Lagena staphyllearia, Brady, 1884, FC, p. 474, pl. lix, figs. 8–11.
Lagena staphyllearia, Millett, 1898, etc., FM, 1901, p. 619, pl. xiv, fig. 2.

Two stations: WS 88, 92.

One excellent specimen at each station.

225. **Lagena schlichti** (Silvestri).

Fissurina carinata (*pars*) Reuss, 1870, FSP, p. 469; Schlicht, 1870, FSP, pl. v, figs. 1–3.
Fissurina schlichti, Silvestri, 1902, LMT, p. 143, text-figs. 9–11.
Lagena schlichti, Chapman, 1914, FORS, p. 66, pl. iv, fig. 27.

Five stations: 48; WS 83, 90, 92, 93.

Well represented but never very common. The best at WS 93.

226. **Lagena lagenoides** (Williamson) (Plate XI, figs. 4, 5).

Entosolenia marginata var. *lagenoides*, Williamson, 1858, RFGB, p. 11, pl. i, figs. 25, 26.
Lagena lagenoides, Balkwill and Millett, 1884, FG, p. 82, pl. ii, fig. 11.

Ten stations: 48, 388; WS 83, 88, 92, 93, 210, 221, 248, 433.

The best specimens and the most numerous at WS 83 and 88, otherwise generally represented by a single specimen. They are all of the original British type, characterized by few tubuli in the peripheral wing.

Length, about 0·30 mm.; breadth, 0·20 mm.

Williamson's figures are, for him, surprisingly bad, but the British type is admirably figured by Balkwill and Millett (*ut supra*). It may be noted here that Reuss, in purporting to give reproductions of Williamson's figures (*ut supra*) (R. 1862, FFL, p. 324, pl. ii, figs. 27, 28) has named them on the plate "*L. appendiculata* Will." This is quite inexplicable, there being, so far as we know, no other record of this specific name.

227. **Lagena lagenoides** var. **radiata** (Seguenza) (Plate XI, figs. 6–8).

Fissurina radiata, Seguenza, 1862, FMMM, p. 70, pl. ii, figs. 42, 43.
Fissurina radiata, Silvestri, 1902, LMT, p. 145, figs. 20–2.
Lagena lagenoides, Brady, 1884, FC, p. 479, pl. lx, figs. 13, 14 (only).
Lagena sub-lagenoides, Cushman, 1910, etc., FNP, 1913, p. 40, pl. xvi, fig. 4.

Two stations: 228; WS 408.

At WS 408 the species is represented by three very fine specimens of the form separated by Seguenza (*ut supra*). We do not think they would be worth recording separately but for the fact that they differ so markedly from the normal Falkland type. Cushman in creating his species *L. sub-lagenoides* for two of Brady's series of figures has apparently overlooked Seguenza's species. The Falkland Islands specimens do not exhibit the sigmoid curve of the wing figured by Silvestri (*ut supra*). At 228, the variety is represented by a single trigonal specimen which we figure (Plate XI, fig. 8).

Average length, 0·70 mm.; breadth, 0·42 mm.; thickness, 0·15 mm.

228. **Lagena lagenoides var. tenuistriata, Brady.**

Lagena tubulifera var. *tenuistriata*, Brady, 1879, etc., RRC, 1881, p. 61.
Lagena lagenoides var. *tenuistriata*, Brady, 1884, FC, p. 479, pl. lx, figs. 11, 15, 16.
Lagena lagenoides var. *tenuistriata*, Cushman, 1910, etc., FNP, 1913, p. 39, pl. xvi, fig. 3.

Four stations: 230; WS 93, 217, 245.

A single specimen at each station, all of them identical in form with British specimens but somewhat larger.

229. **Lagena ornata (Williamson).**

Entosolenia marginata var. *ornata*, Williamson, 1858, RFGB, p. 11, pl. i, fig. 24.
Lagena ornata, Heron-Allen and Earland, 1913, CI, p. 88, pl. vii, fig. 8.

Two stations: WS 88, 90.

A single typical specimen of this very distinctive form at each station. Outside British seas, where it is abundant, the records are few and far apart.

230. **Lagena quadralata, Brady (Plate XI, figs. 9–12).**

Lagena quadralata, Brady, 1884, FC, p. 464, pl. lxi, fig. 3.

Four stations: 228, 235; WS 83, 93.

Brady lays stress on the fact that his species has four wings only, but we have specimens, not only from the Falklands but elsewhere, exhibiting a varying number of wings, between four and eight, but otherwise agreeing with his figure and description.

The number of wings appears therefore to be useless for the purposes of diagnosis. A more reliable feature is the constant presence of the conspicuous tubules in the wing to which he also refers. These appear to indicate an affinity with *Lagena lagenoides*, Will., and we think it probable that Brady's species is merely a polygonal form of that species. We therefore suggest as an amended description: "Test flask-shaped, with a produced and sometimes elongate neck, from the base of which a varying number of conspicuously tubulated wings originate, and vertically encircling the test, join at the base. The space between the wings is filled with weak vertical striae".

L. quadralata was found in some numbers at WS 83, single specimens only at the other stations.

Average length, 0·22 mm.; breadth, 0·11 mm.

231. **Lagena marginato-perforata, Seguenza.**

Lagena marginato-perforata, Seguenza, 1879–80, FTR, p. 332, pl. xvii, fig. 34.
Lagena marginato-perforata, Heron-Allen and Earland, 1913, CI, p. 86, pl. vii, figs. 5, 6.
Lagena marginato-perforata, Heron-Allen and Earland, 1914, etc., FKA, 1915, p. 663, pl. l, figs. 24–30.

Five stations: WS 83, 88, 90, 92, 93.

A single strongly marked specimen at each station.

232. **Lagena fimbriata**, Brady (Plate XI, figs. 13–16).

Lagena fimbriata, Brady, 1879, etc., RRC, 1881, p. 61; 1884, FC, p. 486, pl. lx, figs. 26–8.
Lagena fimbriata, Sidebottom, 1912, etc., LSP, 1912, p. 422. pl. xx, figs. 24–6.

Eleven stations: 51, 236; WS 80, 83, 88, 92, 93, 97, 248, 408, 433.

The Falkland specimens are quite good and typical, the best at WS 88, 93 and 97. Trigonal specimens at WS 83 and 93 (Plate XI, fig. 16). At 236, the specimens have abnormally developed fimbriate bases. There is a constant tendency to pass into *L. auriculata* by the filling in of the basal excavation at its central point so as to form two separate loops. At WS 433 a specimen showing the fine spinous processes figured by Brady, pl. lx, fig. 26 and referred to by Sidebottom (*ut supra*).

Size varies greatly, ranging up to 0·35 mm. or more in length, 0·25 mm. in breadth.

233. **Lagena fimbriata var. occlusa**, Sidebottom (Plate XI, figs. 17, 18).

Lagena fimbriata, Brady, var.n. *occlusa*, Sidebottom, 1912, LSP, p. 423, pl. xx, figs. 27, 28.

One station: WS 89.

Two specimens of the broad variety (fig. 28 *supra*).

Length, 0·23 mm.; breadth, 0·20 mm.; thickness, 0·13 mm.

234. **Lagena danica**, Madsen (Plate XI, figs. 19, 20).

Lagena danica, Madsen, 1895, FDH, p. 196, pl. O, fig. 4.
Lagena danica, Goës, 1896, DOA, p. 53, pl. v, figs. 11, 12.

Four stations: 48, 388; WS 88, 90.

Single specimens at each, the best at WS 88. Although the basal wings are well marked in side view, they do not project, with the result that the edge view shows even less of a basal cleft than in Madsen's figure. The base of our specimen is flat, and abruptly truncated as shown in our figure 20.

235. **Lagena rizzae** (Seguenza).

Fissurina rizzae, Seguenza, 1862, FMMM, p. 72, pl. ii, fig. 50.
Lagena rizzae, Heron-Allen and Earland, 1913, CI, p. 89, pl. vii, fig. 9.
Lagena quadrata var. *rizzae*, Cushman, 1910, etc. FNP, 1913, p. 35, pl. xix, fig. 4.

Three stations: WS 83, 88, 90.

A single specimen at each. This little species has probably been overlooked at some of the other stations.

236. **Lagena bicarinata** (Terquem).

Fissurina bicarinata, Terquem, 1882, FEP, p. 31, pl. i (ix), fig. 24.
Lagena bicarinata, Heron-Allen and Earland, 1916, FSC, p. 46, pl. vii, figs. 2, 3.

Four stations: WS 77, 83, 90, 92.

Typical specimens are extremely rare. The best at WS 83 and 90. There is a considerable amount of variation, not only in the shape of the test, which varies from

circular to oval, but also in the texture of the shell. Usually glassy, though at some stations it varies from glassy, through "matt", to rough in surface texture.

237. **Lagena bicarinata** (Terquem) var. **occlusa**, var.n. (Plate XI, figs. 21, 22).

Two stations: WS 83, 88.

In this variety the marginal edges of the keels are more or less closed in. It bears the same relationship to the type as did Sidebottom's var. *occlusa* to the type of *L. fimbriata* (S. 1912, etc., LSP, 1912, p. 423, pl. xx, figs. 27, 28).

Length, 0·20 mm.; breadth, 0·15 mm.; thickness, 0·11 mm.

238. **Lagena revertens**, sp.n. (Plate XI, figs. 23–28).

Twelve stations: 48, 388; WS 71, 83, 86, 87, 88, 93, 221, 245, 248, 408.

Test flask-shaped, compressed, furnished with a more or less extended or compressed neck, terminating in a lipped extremity, which carries the fissurine aperture. From this lip extend two keels, which may, in rare instances, encircle the shell (fig. 27). Usually there is a solution of continuity at the aboral end of the shell, where the keels *return* upon themselves in independent loops, which are separated by a space of varying dimensions (fig. 28). This basal space in the periphery may be either smooth, or furnished with a knob or projecting spine of varying size. The texture of the two faces of the shell is very variable also, ranging from clear glassy transparency to a semi-opaque rugosity.

Size variable, averages about 0·45 mm. long, 0·30 mm. broad, 0·24 mm. thick.

The foregoing description is an attempt to portray one of the most frequent, yet variable of the Falkland Islands *Lagenae*. It is very typical of many stations, notably WS 83, 86, 93, 245 and 248, and at the same stations the full range of form and surface texture may be found, thus showing the futility of any attempt to separate varieties by these characteristics. It is not at all clear whether its affinities are with the keeled *L. bicarinata* group, or with the looped *L. auriculata* group, neither of which is strongly represented in the area.

239. **Lagena bisulcata**, sp.n. (Plate XI, figs. 29–32).

Four stations: WS 86, 90, 215, 217.

Test nearly circular, slightly produced at the oral extremity which covers a fissurine aperture; thick-walled, turgid, marginal wall thickened, rounded, and forming a solid thick keel round the basal half of the shell; the aboral half of each face of the shell is separated from the peripheral edge by a broad, rounded shallow groove which extends right round the basal half of the face; texture smooth and glassy, becoming opaque in dead shells; dull and roughened in the grooves.

Average length of good specimens about 0·30 mm.; breadth, the same; thickness, 0·20 mm.

This is a very characteristic species, never very abundant. Best and most numerous at WS 217. Its affinities are not very clear, but Brady figures a somewhat similar form (B. 1884, FC, pl. lix, fig. 7) under the name *Lagena quadricostulata*, Reuss (?), which,

however, differs from our species by the fact that the grooves are interrupted by a stout basal spine. No basal obstacle is present in the Falkland forms. Cushman also figures (C. 1910, etc., FNP, 1913, p. 33, pl. xviii, fig. 2) a very similar form which he regards as a variety of *L. alveolata*, Brady and calls "var. *plebeia*". The figure is not very clear and we have not been able to see the types. If, however, it is allied to *L. alveolata* it should not have continuous grooves round the base.

240. **Lagena orbignyana** (Seguenza).

Fissurina orbignyana, Seguenza, 1862, FMMM, p. 66, pl. ii, figs. 25, 26.
Lagena orbignyana, Brady, Parker and Jones, 1888, AB, p. 222, pl. xliv, fig. 20.
Lagena orbignyana, Chapman, 1914, FORS, p. 66, pl. iv, fig. 29.

Six stations: 51; WS 83, 84, 88, 217, 221.

Singularly rare and usually small and weak. Excellent specimens however at WS 217.

241. **Lagena orbignyana** var. **bifida**, Heron-Allen and Earland.

Lagena orbignyana var. *bifida*, Heron-Allen and Earland, 1924, FGM, p. 152, pl. ix, figs. 46–50.

Two stations: 388; WS 92.

A single specimen at each station referable to this variety. They differ from the Australian fossils only in being perfectly circular, instead of being oval, in plan.

242. **Lagena pulchella**, Brady (Plate XI, figs. 33, 34).

Lagena pulchella, Brady, 1866, *Rep. Brit. Ass.* (1867), p. 70.
Lagena pulchella, Brady, 1870, FTR, p. 294, pl. xii, fig. 1 *a*, *b*.
Lagena pulchella, Balkwill and Wright, 1885, DIS, p. 342, pl. xii, fig. 19.

Eleven stations: WS 76, 80, 83, 92, 93, 97, 99, 210, 221, 225, 248.

By contrast with the rarity of *L. clathrata*, the weakly developed *L. pulchella* is comparatively common in the Falkland material. The difference lies in the irregular distribution of the perpendicular costae, which in *L. clathrata* run in regular bars, whilst in *L. pulchella* they start from the upper and lower marginal edges, are slightly wavy, and often fade out to invisibility in the central area of the shell. The Falkland specimens vary considerably in the strength of their markings and there is often a tendency on the part of the costae to coalesce and form a reticulate marking linking it with *L. laureata*, Heron-Allen and Earland (No. 244 *post*).

Length, about 0·20 mm.; breadth, 0·18 mm.

243. **Lagena clathrata**, Brady (Plate XI, figs. 35, 36).

Lagena clathrata, Brady, 1884, FC, p. 485, pl. lx, fig. 4.
Lagena clathrata, Balkwill and Millett, 1884, FG, p. 82, pl. ii, fig. 14.

Three stations: 388; WS 88, 245.

An excellent specimen at WS 88, very strongly marked, and several similar specimens

at 388 and WS 245. In all of them the central carina is double, the intervening space being divided into cellules by transverse bars.

Length, 0·45 mm.; breadth, 0·28 mm.; thickness, 0·22 mm.

244. **Lagena laureata**, sp.n. (Plate XI, figs. 37–40).

Thirteen stations: 51; WS 71, 83, 86, 88, 89, 90, 92, 93, 221, 225, 248, 408.

Test compressed, oval, increasing in width slightly towards the base. Furnished with a median keel, with or without subsidiary keels. From the median point of the base, costae diverge and follow the line of curvature of the edge of the shell: they are most strongly marked near the edges, and more feebly in the median area, where they rarely extend to more than one-third the length of the shell. The surface of the shell beyond the points to which the costae extend is somewhat coarsely areolated, the strength of the markings varying between coarse punctation of the shell and definite hexagonal ornament. The proportion of surface covered by costate or punctate markings varies greatly; as a rule the most strongly costate forms have otherwise the smoothest surface, whereas specimens with feeble surface costation often have strongly marked hexagonal pits. The whole ornamentation strongly suggests a laurel wreath encircling a "hammered" plaque.

This is one of the most typical of the Falkland species, often abundant, notably at WS 83, 88. It varies greatly in size, the finest specimen, which we figure (fig. 37) from WS 86, is 0·35 mm. long, and 0·33 mm. broad as compared with average dimensions of about 0·20 mm. long, and 0·18 mm. broad.

245. **Lagena auriculata**, Brady (Plate XI, figs. 41–46).

Lagena auriculata, Brady, 1879, etc., RRC, 1881, p. 61; 1884, FC, p. 487, pl. lx, figs. 29, 31, 33.
Lagena auriculata, Millett, 1898, etc., FM, 1901, p. 625, pl. xiv, fig. 15 (only).

Eleven stations: 48, 388; WS 71, 76, 83, 88, 91, 92, 93, 221, 245.

The best specimens at WS 83 and 93. At most of the stations the specimens are of the same form as the local variety of *L. alveolata*, and are with difficulty separable without a close examination of the basal excavations. But at WS 83 and some other stations another, and very distinctive variety occurs, in which the auricles are very widely separated and tightly compressed.

Size variable, average length about 0·25 mm.; breadth, 0·22 mm.

246. **Lagena alveolata**, Brady, var. **separans**, Sidebottom (Plate XI, figs. 47–49).

Lagena alveolata var. *separans*, Sidebottom, 1912, etc., LSP, 1912, p. 425, pl. xxi, fig. 5.

Seven stations: WS 83, 88, 91, 92, 93, 221, 248.

Frequent, and very handsome specimens, especially at WS 83 and 88. The type, *L. alveolata*, as figured by Brady, does not occur in the Falkland material. Sidebottom's specimens were from the South-west Pacific.

Average length about 0·30 mm.; breadth, 0·28 mm.; thickness, 0·25 mm.

Sub-family *NODOSARIINAE*

Genus **Nodosaria**, Lamarck, 1812

NOTE. *Nodosariae* with basal spines are not uncommon, but the Falkland material has furnished specimens of *N. laevigata* and *rotundata* in which the spinous outgrowths attained a development which we have not seen elsewhere, and which does not appear to have been figured by other authors, although Millett has figured *N. laevigata* with fine spines (M. 1898, etc., FM, 1902, pl. xi, fig. 1), also Cushman (C. 1910, etc., FNP, 1913, pl. xxiv, fig. 1) and Flint (F. 1899, RFA, pl. lv, fig. 3) have figured *L. rotundata* with one or more stout basal spines. In the Falkland specimens, however, these spines attain a length and strength which constitute a very remarkable and outstanding feature of the test. We do not regard this spinous ornament as having any specific or varietal value: it is no doubt connected with the depth and conditions of the deposits.

247. **Nodosaria rotundata** (Reuss) (Plate XII, fig. 1).

Glandulina rotundata, Reuss, 1849–50, FOT, p. 366, pl. xlvi (1), fig. 2.
Nodosaria (G.) rotundata, Brady, 1884, FC, p. 491, pl. lxi, figs. 17–19.

Six stations: 230, 235, 236; WS 99, 408, 433.

The normal type is found only at WS 99. At all the other stations the specimens are large, and strongly spinous.

Length, 1·32 mm. without spines, which are more than 0·15 mm. long.

248. **Nodosaria laevigata**, d'Orbigny (Plate XII, fig. 2).

Nodosaria (G.) laevigata, d'Orbigny, 1826, TMC, p. 252, no. 1, pl. x, figs. 1–3.
Nodosaria (G.) laevigata, Brady, 1884, FC, pp. 490, 493, pl. lxi, figs. 17–22, 32.
Nodosaria (G.) laevigata, Millett, 1898, etc., FM, 1902, p. 509, pl. xi, fig. 1.

Three stations: 235; WS 215, 408.

The best at WS 408, where the specimens bear from one to many spines. Length, 1·45 mm. without spines, which were probably 0·20 mm. in length when perfect. The Type is missing.

249. **Nodosaria radicula** (Linné).

Nautilus radicula, Linné, 1767, etc., SN (ed. xii), p. 1164.
Nodosaria radicula, Brady, 1884, FC, p. 495, pl. lxi, figs. 28–31.

One station: WS 215.

A single specimen.

250. **Nodosaria scalaris** (Batsch).

Nautilus (Orthoceras) scalaris, Batsch, 1791, CS, p. 2, pl. ii, fig. 4.
Nodosaria scalaris, Brady, 1884, FC, p. 510, pl. lxiii, figs. 28–31; pl. lxiv, figs. 16–19.
Nodosaria scalaris, Cushman, 1910, etc., FNP, 1913, p. 58, pl. xxiv, fig. 7.

Seven stations: 388; WS 71, 83, 88, 93, 221, 408.

Never very abundant, the best at WS 83. The general type at all the stations is similar to those commonly found in British dredgings, in which the sides of the test are practi-

cally parallel, there being no rapid increase in the diameter of the successive chambers. The typical form, in which the chambers are few in number and increase rapidly in diameter towards the oral extremity, occurs at WS 71 and 93, but is much more finely costate than is usually the case. There is the usual variation, especially at WS 83, where the species is common, and included a marginuline specimen which might be attributed to *Amphicoryne falx*, Jones and Parker, but is doubtless merely a local sport of a common species. At the same station a complete series might be obtained linking up *N. simplex* and *N. scalaris*.

251. Nodosaria simplex, Silvestri.

Nodosaria simplex, O. Silvestri, 1872, NFVI, p. 95, pl. xi, figs. 268–72.
Nodosaria simplex, Brady, 1884, FC, p. 496, pl. lxii, figs. 4–6.
Nodosaria simplex, Heron-Allen and Earland, 1913, CI, p. 91, pl. viii, fig. 1.

Two stations: WS 83, 221.

Very good specimens at WS 83.

252. Nodosaria calomorpha, Reuss.

Nodosaria calomorpha, Reuss, 1865–6, FABS, p. 129, pl. i, figs. 15–19.
Nodosaria calomorpha, Brady, 1884, FC, p. 497, pl. lxi, figs. 23–7.

Seven stations: 388; WS 80, 83, 88, 89, 221, 225.

Rare except at WS 83 and 88. The specimens seldom have more than two chambers.

253. Nodosaria filiformis, d'Orbigny.

Nodosaria filiformis, d'Orbigny, 1826, TMC, p. 253, no. 14.
Nodosaria filiformis, Brady, 1884, FC, p. 500, pl. lxiii, figs. 3–5.

One station: WS 89.

One broken specimen.

254. Nodosaria communis, d'Orbigny.

Nodosaria (Dentalina) communis, d'Orbigny, 1826, TMC, p. 254, no. 35.
Nodosaria communis, Brady, 1884, FC, p. 504, pl. lxii, figs. 19–22.
Nodosaria communis, Heron-Allen and Earland, 1916, FWS, p. 256, pl. xlii, figs. 1–2.

Nine stations: 228, 388; WS 83, 88, 92, 213, 217, 245, 433.

Occasional specimens, the best at WS 88 and 217. At WS 83, 217 and 245, they are all of the compressed vaginuline type figured by us (*ut supra*). The Type is missing.

254 A. Nodosaria roemeri (Neugeboren).

Dentalina roemeri, Neugeboren, 1856, OLS, p. 82, pl. ii, figs. 13–17.
Nodosaria roemeri, Brady, 1884, FC, p. 405, pl. lxiii, fig. 1.
Nodosaria roemeri, Cushman, 1910, etc., FNP, 1913, p. 55, pl. xxiv, figs. 4–6.

One station: 388.

Frequent.

255. **Nodosaria pauperata** (d'Orbigny).

Dentalina pauperata, d'Orbigny, 1846, FFV, p. 46, pl. i, figs. 57, 58.
Nodosaria pauperata, Brady, 1884, FC, p. 500, text-figs. 14 *a*, *b*, *c*.

Fifteen stations: 230, 235, 388; WS 76, 80, 91, 92, 97, 98, 99, 215, 217, 225, 248, 408.

Occasional specimens, often very large, and then generally broken. Except at 235 and WS 99 and 408, all the specimens are megalospheric. At WS 99 and 408, both megalospheric and microspheric specimens occur; at 235 the microspheric form only. The finest specimens are from 235 and WS 215 and 217. The Paris Type is missing.

256. **Nodosaria soluta** (Reuss).

Dentalina soluta, Reuss, 1851, FSUB, p. 60, pl. iii, fig. 4.
Nodosaria soluta, Brady, 1884, FC, p. 503, pl. lxii, figs. 13–16; pl. lxiv, fig. 28.

Five stations: 228; WS 76, 245, 248, 433.

An occasional specimen only, the best at WS 248. All megalospheric.

257. **Nodosaria capitata**, Boll.

Nodosaria capitata, Boll, 1846, GDO, p. 177, pl. ii, fig. 13.
Nodosaria capitata, Reuss, 1855, TNMD, p. 223, pl. i, fig. 4; 1865, FDO, p. 454, pl. i, figs. 8–10.
Nodosaria capitata, Millett, 1898, etc., FM, 1902, p. 517, pl. xi, fig. 6.

One station: 6 April 30. 54° 35′ 30″ S, 61° 25′ 00″ W. 320 m.

A single megalospheric fragment of three chambers. The species is apparently very rare in the recent condition, indeed Millett's record of a single fragment from the Malay Archipelago appears to constitute the only published record. But it is not uncommon at several "Goldseeker" stations in deep water round the Scottish coast, and we have also specimens in our collection from "Challenger" station (No. uncertain),[1] 620 fms., and from the Bay of Naples, 1000 m. The species has many synonyms, of which Millett (*supra*) gives a selection.

258. **Nodosaria pellita**, Heron-Allen and Earland (Plate XII, figs. 3, 4).

Nodosaria pellita, Heron-Allen and Earland, 1922, TN, p. 173, pl. vi, figs. 28, 29.

Three stations: WS 83, 221, 248.

Two specimens exactly comparable with the Type were found at WS 248. At WS 221 a single specimen from which the characteristic outer layer had almost entirely disappeared, leaving a very feeble hispid surface. A specimen in the same condition was found at WS 83, but this ran to four chambers arranged in a slightly curved series (fig. 4). The original description of the species, which was based on specimens dredged at 289 fms. off the Continental Shelf to the south-east of New Zealand (51° 30′ 04″ S, 172° 12′ 00″ E), will therefore require amendment in respect of the number of chambers, which was stated to be "two only".

[1] Our slide (from the Millett collection) is labelled "Chall. 8", but Challenger Stn. 8 is in the mid-Atlantic, 2700 fms.

The occurrence of this species so far from its original, and, as far as we know, its only recorded habitat, is noteworthy.

Largest specimen (of two chambers) was 0·35 mm. long, and 0·16 mm. at its greatest breadth. The four-chambered specimen was 0·52 mm. long, and 0·16 mm. broad.

259. **Nodosaria lepidula**, Schwager (Plate XII, fig. 5).

Nodosaria lepidula, Schwager, 1866, FKN, p. 210, pl. v, figs. 27–8.
Nodosaria (*Sagrina*?) *lepidula*, Schubert, 1911, FFB, p. 75, figs. 5 *a–f*.
Nodosaria lepidula, Cushman, 1921, FP, p. 203, pl. xxxvi, fig. 6.

One station: WS 90.

A small specimen 0·28 mm. long, clearly referable to Schwager's species. *N. lepidula* appears to be merely a straight form of the earlier dentaline *N. adolphina* of d'Orbigny.

Genus **Lingulina**, d'Orbigny, 1826

260. **Lingulina biloculi**, Wright.

Lingulina carinata var. *biloculi*, Wright, 1910–11, ECM, p. 13, pl. ii, fig. 10.
Lingulina biloculi, Heron-Allen and Earland, 1913, CI, p. 94, pl. viii, figs. 5–7.

Five stations: 388; WS 71, 83, 88, 92.

Occasional specimens only. At WS 71 and 83, they are of the sharp-edged *L. quadrata* type. At 388 and WS 88, of the rounded-edged *Lagena malcomsonii* type. At WS 92, both forms occur together.

261. **Lingulina quadrata**, Heron-Allen and Earland.

Lingulina quadrata, Heron-Allen and Earland, 1913, CI, p. 95, pl. viii, fig. 11.
Lingulina quadrata, Cushman, 1918, etc., FAO, 1923, p. 94, pl. xvii, fig. 12.

Three stations: 388; WS 93, 408.

Very rare; at WS 93 some of the specimens are very narrow and hardly separable from *L. biloculi*.

262. **Lingulina falcata**, sp.n. (Plate XII, figs. 6–8).

Four stations: 388; WS 83, 88, 93.

Test hyaline, highly compressed, bilocular. The first chamber nearly circular in plan, furnished with a thickened edge. The second chamber varying in shape from an irregularly quadrate to an almost obtusely rounded chevron. The broad, curving anterior edge is solid and furnished at the outer extremities with a recurved hook, and is perforated with a fissurine aperture, sometimes connecting with a short entosolenian tube.

Length, about 0·22 mm.; breadth, 0·14 mm.

Occasional specimens at each station. This is a very distinctive little form. It may perhaps be a linguline and compressed development of *Lagena falcata*, Chaster (*vide ante* No. 220), which normally has a broad solid neck very similar in appearance to, though less extensive than, the final chamber of *Lingulina falcata*. In a single abnormal specimen,

from WS 83, which we also figure (fig. 8), the anterior margin of the final chamber is simple, except at the line of junction of the initial chamber, where there are two projecting solid beads, probably replacing the normal marginal hooks. This specimen is more quadrate in shape, being 0·21 mm. long, by 0·18 mm. broad.

263. **Lingulina translucida**, nom.nov. (Plate XII, figs. 9–11).

Lingulina carinata var. *seminuda*, Heron-Allen and Earland (*non* Hantken), 1916, FWS, p. 259, pl. xlii, figs. 6, 7.
Lingulina seminuda, Cushman, 1918, etc., FAO, 1923, p. 95, pl. xvii, fig. 11 (only).

One station: WS 83.

The pretty little form which we figured from Scottish waters (*ut supra*) occurs in some numbers at WS 83, and in view of its wide range and minute size we think Cushman's suggestion (*ut supra*) that it is distinct from Hantken's species is probably correct. The original description was: "The test is bilocular, the last chamber forming quite three-fourths of the total bulk of the shell, and furnished with a long curving entosolenian tube which runs diagonally to the lower outer edge of the chamber. The margin of the entire shell is thickened and slightly constricted on its inner edge, so as to form a fine groove running round inside the edge of the shell. These markings we consider homologous with the sulci of the deep water form".

The only comments suggested by the examination of the Falkland Islands specimens are that the oral end of the initial chamber appears to be absorbed, so as to form a large eroded aperture. This was also the case in the Scottish specimens, but as the eroded edge coincided with the sutural line it was overlooked. The groove round the edge is so slight as to be negligible. The original drawing over-emphasized it. The test is very hyaline, and lenticular in section like the original model of *L. carinata* (d'Orbigny, 1826, Modèle no. 26) to which our species is undoubtedly allied.

Length, about 0·18 mm.; breadth, 0·15 mm.; thickness, 0·10 mm.

264. **Lingulina vitrea**, sp.n. (Plate XII, figs. 12–14).

Three stations: 388; WS 88, 93.

Test vitreous, smooth, compressed, consisting of a large reniform proloculum, followed by seven to ten chevron-formed chambers slightly embracing and very gradually increasing in size. Peripheral edge rounded and continuous (without lobulation). The central line of the shell is somewhat depressed, as if gouged out, and the terminal aperture is simple, without entosolenian tube.

Length, up to 0·35 mm.; greatest breadth, about 0·10 mm.

This is a very distinctive form by reason of its depressed median line; in some respects this is suggested by the section of the figures of *L. carinata* published by Haeusler (H. 1890, FST, pl. xiv, fig. 33 *a*). He refers to the *L. elisa* of Schwager (S. 1865, FJS, p. 115, pl. iv, figs. 20, 20 *a*) and his *L. ovalis* (*loc. cit.* p. 116, pl. iv, figs. 21–24) of which the several figures exhibit a tendency, more or less pronounced, to present this feature, which he describes as "biscuit-shaped".

One of the specimens figured probably represents the megalospheric form, the proloculum being equal in breadth to the subsequent chambers, which are only four in number. It is rare everywhere.

Frondicularia, Defrance, 1824

264 A. **Frondicularia sidebottomi, Cushman.**

Frondicularia spathulata, Sidebottom, 1904, etc., RFD, 1907, p. 5, pl. i, fig. 26.
Frondicularia spathulata, Heron-Allen and Earland, 1913, CI, p. 97, pl. viii, fig. 12.
Frondiculari sidebottomi, Cushman, 1918, etc., FAO, 1923, p. 140, pl. xxi, fig. 6.

One station: 388.

Two good specimens.

Genus Vaginulina, d'Orbigny, 1826

265. **Vaginulina legumen (Linné).**

Nautilus legumen, Linné, 1788, SN (ed. XIII), p. 3373, no. 22.
Vaginulina legumen, Brady, 1884, FC, p. 530, pl. lxvi, figs. 13–15.
Vaginulina legumen, Burrows, Sherborn and Bailey, 1890, RC, p. 559, pl. x, fig. 16.

Eleven stations: 48, 388; WS 82, 86, 87, 88, 93, 217, 221, 248, 408.

Only occasional specimens, excepting at WS 88, where it is abundant and variable, including many monstrous individuals, due usually to the fusion of two or more primordial chambers.

266. **Vaginulina spinigera, Brady.**

Vaginulina spinigera, Brady, 1884, FC, p. 531, pl. lxvii, figs. 13, 14.
Vaginulina spinigera, Cushman, 1921, FP, p. 259, pl. xlii, fig. 1.

Three stations: 235; WS 215, 408.

No perfect specimens, but fragments of the initial portions at each of the stations. Brady appears to lay stress on the presence of two or more spines as a specific feature. Two-spined specimens are, we must admit, the rule in British dredgings, but the present fragments, though possessing only a single spine, agree in other respects with the type, with which we are familiar from our own dredgings, and it does not seem worth while to separate the two forms on so trivial a point.

267. **Vaginulina badenensis, d'Orbigny.**

Vaginulina badenensis. d'Orbigny, 1846, FFV, p. 65, pl. iii, figs. 6–8.
Vaginulina badenensis, Neugeboren, 1856, OLS, p. 98, pl. v, figs. 7, 8, 9.
Vaginulina badenensis, Costa, 1853, etc., PRN, 1856, p. 181, pl. xii, figs. 16, *a*, *A*.

One station: WS 88.

A few megalospheric specimens only, conforming fairly well to d'Orbigny's type though the spine is either absent or poorly developed. It may be a local variety. There is a Type tube in Paris labelled "*V. badenensis*, d'Orbigny Ipoly Sagh (Haut Hongrie)"

which is probably not the original Type, coming as it does from Upper Hungary. These specimens in the tube agree on the whole with d'Orbigny's figures; both megalo- and microspheric individuals are represented; the spine being either absent or broken, but the sutures are limbate, not depressed as indicated in d'Orbigny's figure.

Genus **Cristellaria**, Lamarck, 1812

268. **Cristellaria crepidula** (Fichtel and Moll) (Plate XII, fig. 15).

Nautilus crepidula, Fichtel and Moll, 1798, TM, p. 107, pl. xix, figs. *g–i*.
Cristellaria crepidula, Brady, 1884, FC, p. 542, pl. lxvii, figs. 17, 19, 20; pl. lxviii, figs. 1, 2.
Cristellaria crepidula, Heron-Allen and Earland, 1916, FSC, p. 47, pl. vii, figs. 5–10.

Twelve stations: 48, 388; WS 71, 83, 84, 86, 87, 88, 92, 93, 245, 246.

Frequently abundant, particularly good at WS 84, 86, 87, 88. At the latter station an extraordinary series of specimens was obtained, ranging from megalospheric individuals attaining a large size to microspheric individuals of tiniest proportions. At this station also three specimens, one of which we figure, were obtained of paired individuals, attached to each other by a development of fine hair-like processes. The largest pair was 0·20 mm. in length, 0·18 mm. extreme width of pair. Two similar pairs were found at 388 where the species is frequent.

269. **Cristellaria tenuissima**, sp.n. (Plate XII, figs. 16–20).

Eight stations: 388; WS 88, 90, 93, 97, 221, 246, 248.

Test minute, hyaline, extremely compressed, consisting of eight to twelve long, narrow, wedge-shaped and tapering chambers, arranged in a curve from the proloculum, each chamber, in turn, forming the chord of the arc, and extending almost the whole length of the shell. Peripheral edge rounded, aperture normally radiate, sutural lines flush but distinct.

Length, 0·30–0·40 mm.; breadth, 0·8–0·14 mm.; thickness, about 0·03 mm.

Many specimens of this extremely delicate and graceful little form, but it is rare everywhere. A single specimen which we figure (fig. 20) from WS 248 may represent the megalospheric form. It has only five chambers following a large reniform proloculum and agrees with the Type in its high degree of compression, and in the shape of the chambers. On the other hand it may be referable to *C. cymboides*, d'Orbigny, with which it is otherwise in agreement. There is considerable variation in the size of the proloculum in the other specimens, which we have regarded as the microspheric form of *C. tenuissima* (figs. 16–19).

C. tenuissima is fairly distinctive, its nearest relative being probably *C. cymboides* d'Orbigny (d'O. 1846, FFV, p. 85, pl. iii, figs. 30, 31), from which it differs by its extreme compression. A somewhat similar object is figured by Sidebottom under the name *Vaginulina costata* (Cornuel) (S. 1918, FECA, p. 139, pl. v, figs. 4, 5), but the test is very much larger. The form of the chambers is also more vaginuline and the sutures limbate.

270. **Cristellaria acutauricularis** (Fichtel and Moll).

Nautilus acutauricularis, Fichtel and Moll, 1798, TM, p. 102, pl. xviii, figs. *g–i*.
Cristellaria acutauricularis, Brady, 1884, FC, p. 543, pl. cxiv, fig. 17.
Cristellaria acutauricularis, Cushman, 1910, etc., FNP, 1913, p. 69, pl. xxxv, fig. 2.

One station: WS 225.

A single typical individual.

271. **Cristellaria hauerina**, d'Orbigny.

Cristellaria hauerina, d'Orbigny, 1846, FFV, p. 84, pl. iii, figs. 24, 25.
Cristellaria hauerina, Reuss, 1866, FABS, p. 140, pl. iii, figs. 2–4; 1870, FSP, p. 481; S, 1870, FSP, p. 47, pl. xiv, figs. 27–30; pl. xv, figs. 1–12.
Cristellaria hauerina, Heron-Allen and Earland, 1915, FSC, p. 47, pl. viii, figs. 2–4.

One station: WS 88.

A number of very variable specimens which are nearer to von Schlicht's figures than to d'Orbigny's original illustration, but the species seems to be extraordinarily variable, hardly any of the Falkland Islands specimens being identical. The Type is missing in Paris so we have not been able to single out any particular variation as fundamental.

272. **Cristellaria obtusata**, Reuss.

Cristellaria obtusata, Reuss, 1870, FSP, p. 479; S. 1870, FSP, pl. xi, figs. 16–18.
Cristellaria obtusata, Brady, 1884, FC, p. 536, pl. lxvi, fig. 17.

One station: WS 88.

One typical specimen.

273. **Cristellaria lata** (Cornuel).

Marginulina lata, Cornuel, 1848, NFM, p. 252, pl. i, figs. 34–7.
Cristellaria lata, Brady, 1884, FC, p. 539, pl. lxvii, fig. 18 *a*, *b*.
Cristellaria lata, Burbach, 1886, etc., FLS, p. 500, pl. x, figs. 10–11.

Two stations: 388; WS 88.

Some good specimens at each station, but the species is, zoologically, merely a broad variety of *C. crepidula*, which species, at this station, runs imperceptibly into it.

274. **Cristellaria gibba**, d'Orbigny.

Cristellaria gibba, d'Orbigny, 1839, FC, p. 40, pl. vii, figs. 20, 21.
Cristellaria gibba, Brady, 1884, FC, p. 546, pl. lxix, figs. 8, 9.
Cristellaria gibba, Chapman, 1914, EDRS, p. 44, pl. v, fig. 8.

Fifteen stations: WS 71, 76, 80, 83, 84, 86, 87, 88, 89, 91, 217, 221, 225, 408, 433.

The finest specimens at WS 86 and 408, others almost equally good at WS 84, 87 and 88. At the remaining stations the specimens are as a rule very small. At WS 86, the specimens are large and more compressed than usual, forming a link between typical *C. gibba* and *C. crepidula*. The Type is missing.

275. **Cristellaria orbicularis** (d'Orbigny).

Robulina orbicularis, d'Orbigny, 1826, TMC, p. 288, no. 2, pl. xv, figs. 8, 9.
Cristellaria orbicularis, Brady, 1884, FC, p. 549, pl. lxix, fig. 17.
Cristellaria orbicularis, Cushman, 1910, etc., FNP, 1913, p. 67, pl. xxxvi, figs. 4, 5.

Three stations: 48; WS 91, 93.

Extremely rare but quite conformable to the Type in Paris. One good specimen at 48, and one individual at WS 93.

276. **Cristellaria rotulata** (Lamarck) (Plate XII, fig. 21).

Lenticulites rotulata, Lamarck, 1804, AM, p. 188, no. 3; 1816, TEM, pl. 466, fig. 5.
Cristellaria rotulata, Parker and Jones, 1865, NAAF, p. 345, pl. xiii, fig. 19.
Cristellaria rotulata, Brady, 1884, FC, p. 547, pl. lxix, fig. 13.

Twenty-three stations: 48, 236, 388; WS 71, 80, 83, 84, 86, 87, 88, 91, 92, 93, 95, 97, 99, 109, 217, 221, 225, 246, 248, 408.

Universally distributed and often fairly common. The finest and largest specimens at WS 408; very good at WS 83, 84, 86, 87, 88. At 236 and WS 217, 221, the species is represented by very small individuals. At WS 88 an abnormal specimen occurs, which we figure, representing the fusion of two megalospheres each of which has continued independent growth.

277. **Cristellaria vortex** (Fichtel and Moll).

Nautilus vortex, Fichtel and Moll, 1798, TM, p. 33, pl. ii, figs. *d–i*.
Cristellaria vortex, Brady, 1884, FC, p. 548, pl. lxix, figs. 14–16.
Cristellaria vortex, Cushman, 1910, etc., FNP, 1913, p. 68, pl. xxxii, fig. 3.

One station: WS 84.

One or two good specimens at this station.

278. **Cristellaria cultrata** (Montfort).

Robulus cultratus, Montfort, 1808–10, CS, 1, p. 214, 54^{e} genre.
Robulina sub-cultrata, d'Orbigny, 1839, FAM, p. 26, pl. v, figs. 19, 20.
Robulina canariensis, d'Orbigny, 1839, FIC, p. 127, pl. iii, figs. 3, 4.
Cristellaria cultrata, Brady, 1884, FC, p. 550, pl. lxx, figs. 4–6.
Cristellaria cultrata, Cushman, 1910, etc., FNP, 1913, p. 64, pl. xxxix, fig. 4.

Eleven stations: 235, 388; WS 83, 84, 87, 88, 91, 92, 97, 245, 408.

The best specimens at WS 408. Other good ones at 388 and WS 88, but as a rule the specimens are poorly developed with scarcely apparent "keels".

There are two Type tubes in Paris, one labelled R. cultrata, *as on the Plate* (pl. v, figs. 19, 20), "Amérique méridionale" in which the specimen is destroyed. In the other, labelled R. sub-cultrata, *as in the Text*, "Îles Malouines", there are seven specimens, some of which agree, in the depth of their keel, with d'Orbigny's figure on pl. v. The others have narrow keels and may be compared with his figure of *R. canariensis* which he himself identified with *R. sub-cultrata*. It is evident that d'Orbigny was not hide-bound in his views upon the importance of the development of the keel.

279. **Cristellaria articulata** (Reuss).

Robulina articulata, Reuss, 1863–4, KTF, p. 53, pl. v, fig. 62; pl. vi, fig. 63.
Cristellaria articulata, Brady, 1884, FC, p. 547, pl. lxix, figs. 10–12.

Six stations: 388; WS 71, 87, 88, 95, 97.

A few specimens only, the best at 388 and WS 87 and 88. At nearly all the stations the species is represented by wild-growing individuals such as are figured by Brady (B. 1884, FC, pl. lxix, figs. 1–4).

280. **Cristellaria crassa**, d'Orbigny.

Cristellaria crassa, d'Orbigny, 1846, FFV, p. 90, pl. iv, figs. 1–3.
Cristellaria crassa, Brady, 1884, FC, p. 549, pl. lxx, figs. 1 *a*, *b*.

Three stations: WS 97, 246, 408.

Occasional specimens at each station. Very large and fine at WS 408, smaller, but typical, at WS 97, quite in conformity with the Type in Paris.

281. **Cristellaria convergens**, Bornemann.

Cristellaria convergens, Bornemann, 1855, FSH, p. 327, p. xiii, figs. 16, 17.
Cristellaria convergens, Brady, 1884, FC, p. 546, pl. lxix, figs. 6, 7.
Cristellaria convergens, Heron-Allen and Earland, 1916, FWS, p. 262, pl. xlii, figs. 13, 14.

One station: WS 83.

Two very small specimens only.

282. **Cristellaria angulata**, Reuss (Plate XII, figs. 22, 23).

Robulina angulata, Reuss, 1851, PTO, p. 154, pl. viii, fig. 6.
Cristellaria convergens (*pars*), (*non* Bornemann) Heron-Allen and Earland, 1916, FWS, p. 262, pl. xlii, figs. 11, 12 (only).

One station: WS 83.

A few small and weak specimens at this station, characterized by the straight peripheral edges of the chambers, forming an angled margin to the test. They appear to be nearer to *C. angulata* (Reuss) from the Tertiary Shales of Upper Silesia (*ut supra*) than to any other form with which we are acquainted. Maximum breadth, about 0·30 mm.

They are identical with some of the specimens which we figured from the West of Scotland (*ut supra*) under the name *C. convergens*, Born., but which we are now satisfied cannot be retained under that name.

Sub-family *POLYMORPHININAE*

Genus **Polymorphina**, d'Orbigny, 1826

283. **Polymorphina lactea** (Walker and Jacob).

Serpula lactea, Walker and Jacob, 1798, AEM, p. 634, pl. xiv, fig. 4.
Polymorphina lactea, Brady, 1884, FC, p. 559, pl. lxxx, typical fig. 11 var. fig. 14.

Five stations: 388; WS 83, 88, 89, 245.

Few and usually very small, the best at WS 88.

284. **Polymorphina plancii** (d'Orbigny) (Plate XII, figs. 24, 25).

Guttulina plancii, d'Orbigny, 1839, FAM, p. 60, pl. i, fig. 5.
Guttulina spicaeformis (Roemer), *sub* Cushman and Ozawa, P, 1930, p. 31, pl. v, figs. 1, 2.

One station: WS 83.

Two very good specimens from this station, recorded as a separate species, merely because the original record (*Guttulina plancii*) was made by d'Orbigny from the Bay of St Blas in Patagonia where it was described as "rare".

The largest specimen is 0·35 mm. long, 0·18 mm. broad.

The Paris Type tube contains two specimens, both rather affected by efflorescence but they were successfully cleaned. One is a fusiform type very much like d'Orbigny's figure in outline, but more compressed and not exhibiting that inflation of the central chamber which is so strongly brought out in d'Orbigny's figure. It is noteworthy that his description says only that the characters are "peu convexe, séparées par des sutures peu profondes". The Type specimen agrees therefore with the text much better than it does with the figure. Another specimen in the same tube is *Lagena globosa*. There appears little doubt that it is the actual specimen from which fig. 1 on pl. i was drawn According to the text this figure is *Globulina australis*, d'Orb. as also figs. 2, 3 and 4, which are true *Polymorphinae* and not in the least resembling fig. 1. It would seem to be a case in which the survival of a Type specimen has justified the artist at the expense of the writer, who in this case are identical. D'Orbigny had two separate organisms, drew them correctly, and then mixed them up.

Cushman and Ozawa (*ut supra*) have associated d'Orbigny's species *G. plancii* with the earlier *P. spicaeformis*, Roemer (R. 1838, CNTM, p. 386, pl. iii, fig. 31), this presumably on comparison of the figure, as Roemer's species has inflated chambers and sunken sutures like d'Orbigny's drawing, but *not* like his type specimen.

285. **Polymorphina williamsoni**, Terquem (Plate XII, figs. 26–28).

Polymorphina lactea var. *oblonga*, Williamson, 1858, RFGB, p. 71, pl. vi, figs. 149, 149 *a*.
Polymorphina williamsoni, Terquem, 1878, FIR, p. 37.
Polymorphina oblonga, Heron-Allen and Earland, 1913, CI, p. 100, pl. viii, fig. 17.
Polymorphina williamsoni, Heron-Allen and Earland, 1930, FPD, p. 175.
Sigmomorphina williamsoni (Terquem), Cushman and Ozawa, 1930, P, p. 139, pl. xxxviii, figs. 3, 4.

Five stations: 388; WS 83, 88, 92, 408.

Except at 388 and WS 88 and 92, the specimens are very small, and have an entosolenian tube in the final chamber. At WS 88, some very large specimens were found, and, at the same station, a small hyaline individual, furnished with a globular accessory chamber attached to the final one (fig. 28). A similar variation was figured by Millett (M. 1898, etc., FM, 1903, p. 262, pl. v, fig. 5), who described it as "evidently a monstrosity", otherwise the specimens would have to be ascribed to the genus *Dimorphina*. Sidebottom having found a few similar growths held the view that it could no longer be regarded as a

monstrosity and named it *Dimorphina millettii* (S. 1918, FECA, p. 145, pl. v, figs. 13, 14). We think this was a mistaken view, although Cushman and Ozawa accept the name in their recent monograph (*ut supra*). None of the figured individuals are identical as regards the exact position and size of the accessory chamber. In the Falkland Islands specimens the accessory chamber, instead of being attached to the apex of the shell, projects from the side of the final chamber, and, although itself furnished with a distinct aperture, connects with that chamber by absorption of the intermediate walls, and not through the oral aperture of the terminal chamber. At WS 408 a specimen, 0·4 mm. long, which is presumably megalospheric. It has only three chambers including the proloculum, which occupies about one-half of the entire test.

286. **Polymorphina sororia**, Reuss.

Polymorphina (*Guttulina*) *sororia*, Reuss, 1863, FCA, p. 151, pl. ii, figs. 25–9.
Polymorphina sororia, Brady, 1884, FC, p. 562, pl. lxxi, figs. 15, 16.

One station: WS 88.

Many excellent specimens.

287. **Polymorphina gibba**, d'Orbigny.

Polymorphina (*Globulina*) *gibba*, d'Orbigny, 1826, TMC, p. 266, no. 20, Modèle no. 63.
Polymorphina gibba, Brady, 1884, FC, p. 561, pl. lxxi, fig. 12 *a*, *b*; fistulose, pl. lxxiii, fig. 16.

Two stations: 388; WS 88.

A few small typical specimens. The Type is missing.

288. **Polymorphina communis**, d'Orbigny.

Polymorphina (*Guttulina*) *communis*, d'Orbigny, 1826, TMC, p. 266, nos. 14 and 15, pl. xii, figs. 1–4, Modèles nos. 61, 62.
Polymorphina communis, Brady, 1884, FC, p. 568, pl. xxii, fig. 19.

Four stations: 388; WS 84, 88, 93.

Uncommon except at WS 88 where it is plentiful, but nearly all the specimens are abnormal. The original Type is missing.

289. **Polymorphina problema**, d'Orbigny.

Polymorphina problema, d'Orbigny, 1826, TMC (*Guttulina*), p. 266, no. 14, Modèle no. 61 (*Polymorphina*).
Polymorphina problema, Brady, 1884, FC, p. 568, pl. lxxii, fig. 20; pl. lxxiii, fig. 1.

One station: WS 71.

A single small specimen. This Type is also missing.

290. **Polymorphina oblonga**, d'Orbigny.

Polymorphina oblonga, d'Orbigny, 1846, FFV, p. 232, pl. xii, figs. 29–31.
Polymorphina oblonga, Brady, 1884, FC, p. 569, pl. lxxiii, figs. 2–4.

Three stations: 48; WS 71, 93.

The specimens are very few in number and far from typical. The best are found at WS 93. The d'Orbigny Types in Paris, three in number, are in splendid condition and agree perfectly with his Plate, *ut supra*.

291. **Polymorphina rotundata** (Bornemann).

Guttulina rotundata, Bornemann, 1855, FSH, p. 346, pl. xviii, fig. 3.
Polymorphina rotundata, Brady, 1884, FC, p. 570, pl. lxxiii, figs. 5–8.

Three stations: 388; WS 88, 92.

A single large specimen at WS 88 and WS 92, many at 388.

292. **Polymorphina compressa**, d'Orbigny.

Polymorphina compressa, d'Orbigny, 1846, FFV, p. 233, pl. xii, figs. 32–4.
Polymorphina compressa, Brady, 1884, FC, p. 565, pl. lxxii, figs. 9–11.

Three stations: 388; WS 88, 221.

Single specimens, generally small, at each station. The Type is missing. At 388 a very large and irregularly formed individual probably referable to this species.

293. **Polymorphina complexa**, Sidebottom.

Polymorphina (?) *complexa*, Sidebottom, 1904, etc., RFD, 1907, p. 16, text-figs. 3–7, pl. iv, figs. 1–9.
Polymorphina complexa, Heron-Allen and Earland, 1914, etc., FKA, 1915, p. 673, pl. li, figs. 1–3; FSC, p. 48, pl. viii, figs. 5–7.

One station: WS 88.

A few quite characteristic specimens of this very variable species. They generally resemble the forms figured by Sidebottom (figs. 3 and 4). The curious apertural pores are quite distinctive, and the colour is the characteristic "pale delicate ivory", semi-transparent as in the Delos specimens.

Genus **Uvigerina**, d'Orbigny, 1826

294. **Uvigerina canariensis**, d'Orbigny, 1826.

Uvigerina canariensis, d'Orbigny, 1839, FIC, p. 138, pl. i, figs. 25–7.
Uvigerina canariensis, Brady, 1884, FC, p. 573, pl. lxxiv, figs. 1–3.
Uvigerina canariensis, Cushman, 1910, etc., FNP, 1913, p. 92, pl. xlii, fig. 6.

Three stations: 48; WS 83, 92.

Represented by a single specimen at each station, very fine and typical at the last two. The Paris Type is missing.

295. **Uvigerina asperula**, Czjzek.

Uvigerina asperula, Czjzek, 1848, FWB, p. 146, pl. xiii, figs. 14, 15.
Uvigerina asperula, Brady, Parker and Jones, 1888, AB, p. 225, pl. xlv, fig. 5 (only).
Uvigerina asperula, Cushman, 1910, etc., FNP, 1913, p. 101, pl. xliii, fig. 1.

Five stations: 230, 235, 236; WS 408, 433.

Very good specimens especially at 236, but the markings are usually weaker than in Czjzek's figure, and much weaker than in Brady's illustrations. Some of the specimens at 230 and 236 showed a tendency to separate the later chambers, approaching *U. interrupta*, Brady.

296. **Uvigerina interrupta**, Brady.

Uvigerina interrupta, Brady, 1879, etc., RRC, 1879, p. 274, pl. viii, figs. 17, 18; 1884, FC, p. 580, pl. lxxv, figs. 12–14.
Uvigerina interrupta, Cushman, 1910, etc., FNP, 1913, p. 103, pl. xliv, fig. 1.

One station: 236.

A few feeble individuals, which may be merely attenuated variations of *U. asperula*.

297. **Uvigerina pygmaea**, d'Orbigny.

Uvigerina pygmaea, d'Orbigny, 1826, TMC, p. 269, pl. xii, figs. 8, 9; Modèle no. 67.
Uvigerina pygmaea, Brady, 1884, FC, p. 575, pl. lxxiv, figs. 11–14.
Uvigerina peregrina, Cushman, 1918, etc., FAO, 1923, p. 166, pl. xlii, figs. 7–10.
Uvigerina pygmaea, Cushman, 1925, etc., LFR, VI (1930), p. 62, pl. ix, figs. 14–20.

Nineteen stations: 48, 235, 236; WS 73, 76, 83, 86, 87, 92, 98, 99, 108, 109, 210, 213, 215, 217, 225, 408.

Far from common and never very typical. The best specimens at WS 86, 92, 210, 215 and 217. At some stations, notably 48 and WS 87 and 99, there is a tendency towards angularity of the test indicating an affinity with *U. angulosa*. Otherwise the specimens are all of the common Atlantic type, so well figured by Brady, and re-named *U. peregrina* by Cushman, to distinguish it from the more slender fossil type of d'Orbigny which he figures (*ut supra*). There is no Type to be found in Paris.

298. **Uvigerina bifurcata**, d'Orbigny (Plate XII, fig. 29).

Uvigerina bifurcata, d'Orbigny, 1839, FAM, p. 53, pl. vii, fig. 17.

Seventeen stations: 228, 230; WS 73, 76, 83, 88, 93, 98, 99, 109, 210, 215, 217, 225, 245, 248, 408.

D'Orbigny's species is merely an elongate form of *U. pygmaea* to which he admits the affinity, but it is a characteristic feature of the Falkland area where d'Orbigny refers to it as "very common". It is not common in the sense that *U. angulosa* is common, but a fair number of specimens are to be found at the many stations where it is recorded. The best were at WS 76, 88, 93, 99, 210 and 248, notably at the two latter, where the tests were often very long. The shells are frequently twisted or otherwise deformed.

Average size, about 1·0 mm. long; 0·38 mm. maximum breadth.

The Paris Type tube contains five specimens, only two of which can be said to have much resemblance to d'Orbigny's figure. They are many-chambered and very finely striate. Of the other specimens, one appears to be a specimen of d'Orbigny's *U. raricosta*, the others being smooth forms in no way referable to any of d'Orbigny's Falkland species.

299. **Uvigerina raricosta**, d'Orbigny (Plate XII, fig. 30).

Uvigerina raricosta, d'Orbigny, 1839, FAM, p. 53, pl. vii, fig. 15.

Three stations: WS 76, 215, 408.

A few specimens which may perhaps be referred to d'Orbigny's species, characterized by a few widely separated costae. D'Orbigny's name has no specific value, the shells being merely variants of *U. pygmaea*.

Length, about 0·30 mm.

The Type was not to be found in Paris.

300. **Uvigerina striata**, d'Orbigny (Plate XII, fig. 31).

Uvigerina striata, d'Orbigny, 1839, FAM, p. 53, pl. vii, fig. 16.
Uvigerina tenuistriata (*non* Reuss *fide* Cushman), Bagg, 1908, FIH, p. 151 (no fig.).
Uvigerina striata, Cushman, 1910, etc., FNP, 1913, p. 94, pl. xliii, fig. 5.

Nine stations: 48; WS 84, 87, 91, 92, 93, 98, 246, 408.

D'Orbigny's species was described from the Falkland Islands. He does not refer to its frequency. We have a few specimens referable to his form, which is distinguished by its doubly-pointed extremities. The best one from WS 93. It cannot be described as common and must not be confused with *U. striata*, Costa (C. 1853, etc., PRN, 1856, p. 266, pl. xv, fig. 3), which is a form of *U. pygmaea*. The specimen figured by Cushman (*ut supra*) is more coarsely costate than the d'Orbignyan figure suggests. The Type tube in Paris, labelled "Patagonia", contains one specimen. This, while conforming to d'Orbigny's drawing in some respects, e.g. the spindle shape acutely pointed at both ends, differs from it in the lesser inflation of the chambers. It is, in fact, one of the many varieties of *U. angulosa* occurring in the Falkland area, characterized by sub-angular edges, slightly inflated chambers and very fine striation. Another tube, labelled merely "Amérique méridionale", contains one of the very finely striate forms of *U. angulosa* and two of the variety separated as *U. bifurcata*.

Length, up to 0·80 mm.; breadth, 0·30 mm.

301. **Uvigerina angulosa**, Williamson (Plate XII, figs. 32–39).

Uvigerina angulosa, Williamson, 1858, RFGB, p. 67, pl. v, fig. 140.
Uvigerina angulosa, Chapman, 1914, EDRS, pp. 32, 44, pl. iii, fig. 22.

All stations with the exception of 236 and WS 72, 78, 79, 94, 243.

This is one of the most characteristic species of the Falkland area, often occurring in enormous numbers and ranging up to 1·0 mm. or more in length; moreover it is polymorphic, and any attempt to separate its variations in the fashion so prevalent to-day would end in the production of quite a number of new species. The variations depend, primarily, on the size of the primordial chamber. In the microspheric form the proloculum is followed by a closely aggregated bunch of chambers and the complete test is short and broad. In the megalospheric test the earlier chambers are much more elongate, and result in a long drawn-out test almost parallel sided in the central part of its length. At nearly all the stations both the long and the short form occur in company. The long (or megalospheric) test usually predominates, often almost to the exclusion of the microspheric. At a few stations, notably WS 99 and 217, the short (or microspheric) form is more abundant. Very long individuals occur at WS 83, 84, 86, 87, 88, 91, 92, 93.

At some of the stations, notably WS 92, 93, 213, 219, 245, the alternation of the shell is carried to such an extent that the final chambers are linear, i.e. it has become a *Sagrina*.

The surface markings show a like range of variation, though the variations are not of very frequent occurrence. The general average of specimens resemble Williamson's figure, but at WS 88 and 91 smooth individuals occur with the type. At WS 97, 109, 210, 245, very coarsely sulcate specimens were observed. At WS 91 many of the individuals of the long type had curved tests. Other abnormalities noticed included a specimen at WS 108, in which, in addition to the normal final chamber, an accessory chamber with an oral aperture had budded out from the penultimate chamber (fig. 38). At WS 217, a specimen in which one of the later chambers was ornamented with coarse spines was found (fig. 39).

302. **Uvigerina angulosa** var. **pauperata**, var.n. (Plate XII, figs. 40–43).

Six stations: 228, 230, 235, 236; WS 408, 433.

Test minute, trihedral in the later stages, tending to inflation in the earlier chambers. In the arrangement of the chambers, it is similar to the type *U. angulosa*, presenting a short, broad microspheric and a long narrow megalospheric form. The surface of the chambers is marked with feeble intermittent costae, between which the surface of the shell is weakly hispid. The later chambers are sometimes somewhat undercut, and the final chamber terminates in a well-marked neck with a reverted lip. The aboral end sometimes terminates in a delicate spine.

Length, up to 0·30 mm.; average breadth, 0·10 mm.

This is probably only a pauperate form of *U. angulosa*. It bears a very close resemblance to that species in the sectional views of its test and the general character of its ornament, but it appears to be separable as occupying a distinct region. All the stations at which it has been recorded lie just outside the continental shelf on which the Falkland Islands stand. The variety is probably almost co-extensive with the type, which it may replace in deeper waters. We have very similar examples from the "Albatross" station 2550 (39° 44′ 30″ N, 70° 30′ 45″ W) at 1081 fms, and from Cyprus (believed to be a fossil).

Genus **Siphogenerina**, Schlumberger, 1883

303. **Siphogenerina dimorpha** (Parker and Jones) (Plate XII, fig. 44).

Uvigerina (Sagrina) dimorpha, Parker and Jones, 1865, NAAF, p. 364, pl. xviii, fig. 18.
Siphogenerina dimorpha, Egger, 1893, FG, p. 317, pl. ix, fig. 30.
Sagrina dimorpha, Heron-Allen and Earland, 1916, FWS, p. 266, pl. xlii, figs. 17, 18.

Seven stations: WS 77, 87, 88, 91, 93, 221, 245.

Except at WS 87 and 88, the species is represented by single individuals. At these two stations, notably WS 88, it was more abundant, and shewed extraordinary variation in length, ranging from the short type of Parker and Jones with only three final chambers, to a very long individual with no less than nine chambers in the linear series, which was 0·95 mm. long, and 0·20 mm. at the maximum breadth.

Family GLOBIGERINIDAE

Genus Globigerina, d'Orbigny, 1826

304. **Globigerina bulloides**, d'Orbigny.

Globigerina bulloides, d'Orbigny, TMC, p. 277, no. 1; Modèles no. 17 and 76.
Globigerina bulloides, Brady, 1884, FC, p. 593, pl. lxxvii; and pl. lxxix, figs. 3–7.

All stations with the exception of 53, 230 and WS 72, 77, 78, 94, 95, 108, 219, 243, 246.

Universally distributed. At the same time it is not one of the common Falkland Islands species, excepting at WS 433. The specimens call for no particular comment except that at a few stations (WS 73, 98, 217 and 409) only very small individuals were found. The general average is large. Very large at WS 91 and 99. At 48 and 228, and WS 79 and 225, pelagic specimens still bearing their superficial spines were found. The Type tube in Paris labelled "Amérique méridionale" contained seven specimens, a mixed collection, probably not d'Orbigny's selection at all. One specimen was typical *G. bulloides*, three were typical *G. triloba*, one *G. sacculifera*, Brady, one probably *G. conglomerata*, but much encrusted, and one too much encrusted for identification.

305. **Globigerina triloba**, Reuss.

Globigerina triloba, Reuss, 1849–50, FOT, p. 374, pl. ii (xlvii), fig. 11.
Globigerina triloba, Brady, 1884, FC, p. 595, pl. lxxix, figs. 1, 2; pl. lxxxi, figs. 2, 3.

All stations with the exception of 48 and WS 73, 77, 84, 94, 98, 108, 219, 221, 243.

Universally distributed. The specimens are more abundant than those of *G. bulloides* and are very uniform in character. Pelagic (spinous) individuals were found at WS 71, 217, 246. At WS 80 and 217, specimens in which the final chamber was still in the thin glassy condition, denoting the process of formation, occurred.

306. **Globigerina inflata**, d'Orbigny.

Globigerina inflata, d'Orbigny, 1839, FIC, p. 134, pl. ii, figs. 7–9.
Globigerina inflata, Brady, 1884, FC, p. 601, pl. lxxix, figs. 8–10.

Twenty-seven stations: 51, 53, 228, 230, 235, 388; WS 71, 76, 83, 86, 87, 88, 89, 90, 91, 92, 93, 95, 97, 99, 217, 221, 225, 245, 248, 408, 433.

Quite the commonest species of *Globigerina* in the Falkland area and very uniform in character, practically the only variation lying in the comparative roughness of the surface. Very rough specimens at WS 93, 97, 99, 217 and 248. The Type is missing.

307. **Globigerina dutertrei**, d'Orbigny (Plate XIII, figs. 1–4).

Globigerina dutertrei, d'Orbigny, 1839, FC, p. 84, pl. iv, figs. 19–21.
Globigerina dutertrei, Brady, 1884, FC, p. 601, pl. lxxxi, fig. 1.

All stations with the exception of 230, 235 and WS 77, 84, 98, 108, 109, 210, 213, 219, 243, 245, 246.

The typical d'Orbignyan form with the high dome and inflated chambers with lobulate margin occurs at most of the stations. It merges by gradation, the height of the dome decreasing and the chambers becoming less inflated, until it assumes a more or less regularly quadrate form, hardly distinguishable from the young stages of *G. conglomerata*, Schwager.

Average diameter, 0·30 mm.; height, 0·20 mm.

D'Orbigny's figure, when compared with his Type specimen in Paris, was found to be considerably idealised; the inflation of the chambers and the depths of the sutures are exaggerated. On the other hand, the figure given by Brady *ut supra* is hardly sufficiently marked as regards these same characteristics; but we have little doubt that it represents the same form as d'Orbigny's type. The Falkland specimens as figured by us are fairly typical, but thinner shelled and more delicate, as might be expected from the difference in latitude, compared with the Cuba types.

308. **Globigerina conglomerata**, Schwager (Plate XIII, figs. 5–8).

Globigerina conglomerata, Schwager, 1866, FKN, p. 255, pl. vii. fig. 113.
Globigerina dutertrei, Brady, 1884, FC, p. 601, pl. lxxxi, fig. 1.
Globigerina dubia, Brady, 1884, FC, p. 595, pl. lxxix, fig. 17.
Globigerina eggeri, Rhumbler, 1900, NPF, p. 19, fig. 20.
Globigerina conglomerata, Cushman, 1927, FWCA, p. 172.

Universally distributed, the best stations being perhaps WS 91 and 248, but in most of the gatherings fine, typical specimens are to be found.

The *Globigerinae* presenting quadrate bases, i.e. the last four chambers, usually of even size, fully visible as a perfect lobulated quadrangle, appear to be characteristic of the Falkland area, where they are very common, and widely distributed. It is not easy to settle upon the nomenclature. The earliest quadrate form, d'Orbigny's *G. quadrilobata* (d'O. 1846, FFV, p. 164, pl. ix, figs. 7–10), does not seem to fit into the scheme of growth of the Falkland types. Rhumbler has figured, but not described, *G. quadrangularis* nom.nov.[1] (R. 1909 etc., FPE, pl. xxx, figs. 18–21, *nom.nov.*), which agrees in plan but is too coarse in surface, and has not the large aperture characteristic of Schwager's species *G. conglomerata*. Under this name Schwager gives a basal view only, which is clearly identical with the basal view of our Falkland Islands specimens. Cushman, working on topo-types of Schwager's species, has identified *G. conglomerata* as the young stage of the form figured by Brady as *G. dubia* (*non* Egger), the intermediate stages being the form figured by Brady as *G. dutertrei*, but differing from d'Orbigny's type of that species in its depressed spire and comparatively continuous (not lobulated) periphery but, as will be seen from what we have stated, *sub G. dutertrei* (No. 307) Brady's figure of that species is, in our opinion, reconcilable with that species. Schwager's specific name *conglomerata* has therefore priority and includes *G. dubia*, Brady (*non* Egger).

309. **Globigerina helicina**, d'Orbigny.

Globigerina helicina, d'Orbigny, 1826, TMC, p. 277, no. 5.
Globigerina helicina, Brady, 1884, FC, p. 605, pl. lxxxi, figs. 4–5.
Globigerina helicina, Cushman, 1910, etc., FNP, 1914, p. 12, pl. iii, figs. 1, 2.

One station: WS 88.

[1] Our friend Dr Rhumbler has been good enough to send us the MS. of his unpublished text, from which it appears that his figured species is founded on *Globigerina regularis*, Egger (E. 1893, FG, p. 163, pl. xiii, figs. 15–18), *non Globigerina regularis*, d'Orbigny (d'O. 1846, FFV, p. 162, pl. ix, figs. 1–3).

A single thick-walled specimen, very like Soldani's original figure (S. 1789, etc., T. 1791, I, pt II, p. 118, pl. 130, figs. *qq*, *rr*). See, however, our remarks upon this species in our 'Terra Nova' Report (H.-A. & E. 1922, TN, p. 192). In many of the Discovery materials, the affinity of this so-called species to *G. dutertrei* is very marked, and many specimens might have been ascribed to it. The Type tube of *G. helicina* in Paris from the "Sub-appenine of Rimini" contains a single large thick-walled *Globigerina* in good condition. It does not correspond at all with the Soldanian figures, nor with the irregular forms usually associated with the species, but is a high-domed, square (four chambers to the convolution) test, with but slightly inflated chambers. It is no doubt the specimen from which the "Planche inédite" was prepared and which is reproduced in outline by Fornasini (F. 1898, GFI, p. 209, fig. 4). But so far as the specific name *helicina* goes the species must rest on Soldani's figures substantiated by Brady's later figures which are in general agreement. D'Orbigny's Type specimen never having been described or figured, except in the unpublished *Planche*, must be disregarded. Fornasini who was acquainted with the *Planche*, but not with the Type specimen, considered it to be identical with his own species *G. adriatica* (F. 1899, GA, p. 582, pl. iii, figs. 6, 7).

310. **Globigerina pachyderma** (Ehrenberg) (Plate XIII, figs. 9–13).

> *Aristerospira pachyderma*, Ehrenberg, 1873, LMT, p. 386, pl. i, fig. 4.
> *Globigerina bulloides*, Brady, 1878, RRNP ("Arctic variety"), p. 435, pl. xxi, fig. 10.
> *Globigerina bulloides*, var. *borealis*, Brady, 1882, FKE, pp. 716, 717.
> *Globigerina pachyderma*, Brady, 1884, FC, p. 600, pl. cxiv, figs. 19, 20.
> *Globigerina pachyderma*, Heron-Allen and Earland, 1922, TN, p. 190 (references).

Twenty-six stations: 51, 53, 228, 230, 235, 236; WS 71, 83, 86, 87, 88, 90, 92, 95, 97, 99, 215, 217, 219, 221, 225, 245, 248, 408, 409, 432.

Universally distributed and often very common, presenting every stage in the reduction of the aperture, from an incurved arch on the final chamber to an almost imperceptible depression in the centre of the basal plane. A full series illustrating these changes at WS 86, 87 and 245. At 230 a very curious thick-walled form occurs (figs. 12, 13), in which the sutural lines have almost vanished and the shell is almost spherical. The same feature, but in a less thick-walled form, occurs at WS 225 and 408.

311. **Globigerina rubra**, d'Orbigny.

> *Globigerina rubra*, d'Orbigny, 1839, FC, p. 82, pl. iv, figs. 12, 14.
> *Globigerina canariensis*, d'Orbigny, 1839, FIC, p. 133, pl. ii, figs. 10–12.

Two stations: 51; WS 88.

A small specimen at each station. They have the characteristic pink colour; in form they agree fairly well with d'Orbigny's *G. canariensis* which Brady and others have regarded as a synonym of *G. rubra*. D'Orbigny however gives the colour of *G. canariensis* as white, but both Types are missing. The Falkland specimens are not furnished with the subsidiary apertures that are characteristic of tropical specimens.

312. **Globigerina elevata**, d'Orbigny.

Globigerina elevata, d'Orbigny, 1840, CBP, p. 34, pl. iii, figs. 15, 16.
Globigerina sp. (?) *rubra*, Brady, 1884, FC, p. 603, pl. lxxxii, figs. 8, 9.
Globigerina rubra, Heron-Allen and Earland, 1913, FNS, p. 131, pl. x, figs. 13–15.

Nineteen stations: 228, 235, 236; WS 71, 73, 79, 83, 86, 88, 90, 92, 109, 221, 245, 248, 408, 409, 432, 433.

Often very abundant, especially in the muddier gatherings. Particularly well-developed and plentiful at WS 71, 83, 88, 92 and 409.

313. **Globigerina digitata**, Brady.

Globigerina digitata, Brady, 1879, RRC, p. 72; 1884, FC, p. 599, pl. lxxx, figs. 6–10; pl. lxxxii, figs. 6–7.
Globigerina digitata, Cushman, 1918, etc., FAO, 1924, p. 11, pl. ii, figs. 9–11.

One station: WS 108.

A single, young, but unquestionable individual of this species, from WS 108. This station is well to the north of the Falkland Islands and close to the American coast, but a long way south of any Atlantic record known to us. The species is much commoner in the Pacific than in the Atlantic Ocean, but never of very frequent occurrence.

Genus **Orbulina**, d'Orbigny, 1826

314. **Orbulina universa**, d'Orbigny.

Orbulina universa, d'Orbigny, 1839, FC, p. 3, pl. i, fig. 1.
Orbulina universa, d'Orbigny, 1839, FIC, p. 123, pl. i, fig. 1.
Orbulina universa, Brady, 1884, FC, p. 608, pl. lxxviii; pl. lxxxi, figs. 8–26; pl. lxxxii, figs. 1–3.

Nine stations: 388; WS 88, 91, 92, 93, 108, 210, 221, 248.

The species is extraordinarily rare, never more than two or three specimens at a station, usually a single one. With the exception of WS 88, where a single thin-walled specimen with internal globigerine chambers was found, all the specimens are thick-walled, bottom-living individuals, mostly smaller than the average size.

Genus **Pullenia**, Parker and Jones, 1862

315. **Pullenia sphaeroides** (d'Orbigny).

Nonionina sphaeroides, d'Orbigny, 1826, TMC, p. 293, no. 1, Modèle no. 43.
Pullenia sphaeroides, Carpenter, Parker and Jones, 1862, IF, p. 184, pl. xii, figs. 11, 12.
Pullenia sphaeroides, Brady, Parker and Jones, 1888, AB, p. 266, pl. xliii, figs. 21, 24.
Pullenia sphaeroides, Cushman, 1910, etc., FNP, 1914, p. 20, pl. xi, fig. 2.

Eight stations: 388; WS 86, 88, 90, 92, 408, 409, 433.

The distribution of this species is curiously restricted. At three stations WS 86, 88 and 92 (which are on the Burdwood Bank, or on the Continental Shelf close to the American Coast), the species is represented by single small individuals (two at 388), but at the remaining stations, which are beyond the Continental Shelf, the species is frequent, large

and typical (identical with the Type specimens in Paris), except at WS 409, which, although beyond the Continental Shelf, is near the Falkland Islands. Here the specimens are small and similar to those found upon the Shelf.

316. **Pullenia subcarinata** (d'Orbigny) (Plate XIII, fig. 14–18).

Nonionina subcarinata, d'Orbigny, 1839, FAM, p. 28, pl. v, figs. 23, 24.
Nonionina quinqueloba, Reuss, 1851, FSUB, p. 71, pl. v, fig. 31.
Pullenia quinqueloba, Brady, 1884, FC, p. 617, pl. lxxxiv, figs. 14, 15.

Twenty-seven stations: 48, 51, 228, 236, 388; WS 71, 72, 76, 80, 84, 86, 88, 90, 91, 93, 97, 98, 99, 109, 210, 215, 217, 225, 245, 248, 408, 433.

Often very common and attaining a very large size, the best being at WS 71, 76, 84, 88 and 91. At WS 84, there was an extraordinary amount of variation in the inflation of the chambers and lobulation of the peripheral edge.

D'Orbigny's species *Nonionina subcarinata* was described from the Falklands where he says it is not uncommon. It appears to have been entirely overlooked by subsequent authors, as we cannot trace any reference to the species, even in the synonomies of the subsequently created, and generally accepted, *Nonionina quinqueloba*, Reuss, 1851. It must not be confused with *Nonionina subcarinata*, Seguenza (S. 1862, RFC, p. 98, pl. i, fig. 3), which, although also a *Pullenia*, is quite distinctive, having an inflated umbilical region and ten visible chambers.

Pullenia subcarinata (d'Orbigny) is characterized by the possession of six visible external chambers and a somewhat inflated shell. Both of these characters are subject to great variation and we are unable to recognize any specific distinction between it and *P. quinqueloba*. The Falkland specimens show every gradation between the figures of Reuss and those of d'Orbigny and, much as we dislike to replace a name which has been generally accepted, we think that under the law of priority the name *P. quinqueloba* (Reuss) must be regarded as a synonym of *P. subcarinata* (d'Orbigny). As the records stand, there is no doubt that many of the records of *P. quinqueloba* were made from, or include specimens of *P. subcarinata*. Several authors refer to the variable number of chambers in their specimens; Brady included (B. 1884, FC, p. 617, pl. 84, fig. 15) a figure which might have been copied from d'Orbigny's.

The size is very variable at different stations, ranging up to 0·70 mm. in diameter, and 0·40 mm. in thickness.

Although the six-chambered d'Orbignyan type is dominant nearly everywhere, five-chambered shells of the *quinqueloba* type only were noted at WS 80 and 245. Also at 228, 236 and WS 408, where the only specimens were few and very small. As these stations are off the Continental Shelf it would seem possible that the depth of water may have an influence on the number of chambers formed. It would seem desirable to take special notice of this feature in the examination of deeper water collections.

There are two Type tubes in Paris, one labelled "Amérique méridionale" containing a single six-chambered specimen. In the other, labelled "Îles Malouines", there are five specimens, two of which are so mounted that the chambers cannot be counted, and of

the other three, two appear to be five-chambered, and the third six-chambered. All are of the inflated type with no marked lobulation at the periphery.

317. **Pullenia obliquiloculata**, Parker and Jones.

Pullenia obliquiloculata, Parker and Jones, 1865, NAAF, pp. 368, 421, pl. xix, fig. 4.
Pullenia obliquiloculata, Brady, 1879, etc., RRC, 1879, p. 294; 1884, FC, p. 618, pl. lxxxiv, figs. 16–20.
Pullenia obliquiloculata, Cushman, 1918, etc., FAO, 1924, p. 43, pl. viii, fig. 10.

Five stations: 235, 236; WS 408, 432, 433.

Confined to these stations which are beyond the Continental Shelf. Very common when it occurs, especially at 236. The shells are rather rougher externally than is usual in this species.

Genus **Sphaeroidina**, d'Orbigny, 1826

317 A. **Sphaeroidina dehiscens**, Parker and Jones.

Sphaeroidina dehiscens, Parker and Jones, 1865, NAAF, p. 369, pl. xix, fig. 5 *a*, *b*.
Sphaeroidina dehiscens, Brady, 1884, FC, p. 621, pl. lxxxiv, figs. 8–11.
Sphaeroidina dehiscens, Cushman, 1918, etc., FAO, 1924, p. 38, pl. vii, fig. 7; pl. viii, figs. 1, 2.

One station: WS 433.

A single immature specimen; the record is of interest as being far to the south of its previously known distribution.

Genus **Candeina**, d'Orbigny, 1839

318. **Candeina nitida**, d'Orbigny.

Candeina nitida, d'Orbigny, 1839, FC, p. 108, pl. ii, figs. 27, 28.
Candeina nitida, Brady, 1884, FC, p. 622, pl. lxxxii, figs. 13–20.

One station: WS 108.

A single specimen at this station which is to the north-west of the Falkland Islands and close to the American coast. Its presence may perhaps be explained by drift, as the locality is well to the south of previous records in the Atlantic. The Type specimen is missing in Paris.

Family ROTALIIDAE

Sub-family *SPIRILLININAE*

Genus **Spirillina**, Ehrenberg, 1841

319. **Spirillina vivipara**, Ehrenberg.

Spirillina vivipara, Ehrenberg, 1841, SNA, p. 442, pl. iii, fig. 41.
Spirillina vivipara, Brady, 1884, FC, p. 630, pl. lxxxv, figs. 1–4.
Spirillina vivipara, Heron-Allen and Earland, 1914, etc., FKA, 1915, p. 683, pl. li, figs. 19–21.

Six stations: 48, 53, 388; WS 71, 87, 88.

Represented by occasional specimens only, excepting at 388 and WS 88 where it was abundant.

320. **Spirillina vivipara** var. **revertens**, Rhumbler.

Spirillina vivipara (*pars*) Brady, 1884, FC, pl. lxxxv, fig. 5 (only).
Spirillina vivipara var. *revertens*, Rhumbler, 1906, FLC, p. 32, pl. ii, figs. 8–10.
Spirillina vivipara var. *revertens*, Cushman, 1910, etc., FNP, 1915, p. 4, pl. i, fig. 3–6.

Four stations: 48, 388; WS 88, 245.

Occasional specimens, the best at 388 and WS 88.

321. **Spirillina obconica**, Brady.

Spirillina obconica, Brady, 1879, etc., RRC, 1879, p. 279, pl. viii, fig. 27; 1884, FC, p. 630, pl. lxxxv, figs. 6, 7.
Spirillina obconica, Heron-Allen and Earland, 1913, CI, p. 108, pl. ix, figs. 8, 9.

Two stations: 388; WS 88.

One or two specimens only at each station, very fine at 388.

321 A. **Spirillina obconica**, Brady, var. **carinata**, Halkyard.

Spirillina obconica var. *carinata*, Halkyard, 1889, RFJ, p. 71, pl. ii, fig. 6.
Spirillina obconica var. *carinata*, Heron-Allen and Earland, 1913, CI, p. 108, pl. ix, figs. 6, 7.
Spirillina latesceptata, Cushman, 1918, etc., FAO, 1931, p. 6, pl. i, figs. 12, 13, pl. ii, fig. 1.

One station: 388.

A single rather weak specimen. Cushman (*ut supra*) has referred this very characteristic little form to *Spirillina lateseptata* Terquem (T. 1875, APD, p. 21, pl. i, fig. 6). But whatever the nature of Terquem's organism, we do not think it can be identical with Halkyard's. Terquem gives the dimensions of his species as 0·80 mm. × 0·84 mm. which for a *Spirillina* is enormous. Only the giant species *S. tuberculata* ever attains such dimensions. The largest specimen of the series of var. *carinata* in our collection measures only 0·31 mm. in greatest diameter, and the average is much less.

322. **Spirillina decorata**, Brady.

Spirillina decorata, Brady, 1884, FC, p. 633, pl. lxxxv, figs. 22–5.
Spirillina decorata, Sidebottom, 1904, etc., RFD, 1908, p. 8, pl. ii, fig. 6.

One station: WS 88.

Represented by a single rather doubtful specimen.

323. **Spirillina margaritifera**, Williamson.

Spirillina margaritifera, Williamson, 1858, RFGB, p. 93, pl. vii, fig. 204.
Spirillina margaritifera, Heron-Allen and Earland, 1930, FPD, p. 180.

One station: WS 88.

Two specimens only which agree with Williamson's figure. It still remains an open question whether Williamson's form is anything more than a pauperate condition of *S. tuberculata*. See our observations *ut supra*.

324. **Spirillina tuberculata**, Brady.

Spirillina tuberculata, Brady, 1879, etc., RRC, 1879, p. 279, pl. viii, fig. 28 (see also Siddall, 1878, FRD, p. 49); 1884, FC, p. 631, pl. lxxxv, figs. 12–16.
Spirillina tuberculata, Cushman, 1910, etc., FNP, 1915, p. 4, pl. i, figs. 7–9; pl. ii, fig. 3; Text-figs. 3, 4.

Three stations: WS 84, 87, 88.

Large individuals, but few in number, at these stations, the best at WS 88.

325. **Spirillina limbata**, Brady.

Spirillina limbata, Brady, 1879, etc., RRC, 1879, p. 278, pl. viii, fig. 26; 1884, FC, p. 632, pl. lxxxv, figs. 18–21.
Spirillina limbata, Flint, 1899, RFA, p. 326, pl. lxxi, fig. 5.

Two stations: 388; WS 88.

Several very fine specimens.

Sub-family *ROTALIINAE*

Genus **Patellina**, Williamson, 1858

326. **Patellina corrugata**, Williamson (Plate XIII, figs. 19–22).

Patellina corrugata, Williamson, 1858, RFGB, p. 46, pl. iii, figs. 86–9.
Patellina corrugata, Heron-Allen and Earland, 1913, CI, p. 109, pl. ix, fig. 11.
Patellina corrugata, Cushman, 1925, etc., LFR, VII, 1930, p. 15, pl. iii, fig. 5.
Patellina corrugata, Parr and Collins, 1930, ANZF, p. 90, pl. iv, figs. 1–5.

Nineteen stations: 48, 51, 53, 388; WS 71, 86, 87, 88, 89, 90, 92, 93, 99, 217, 221, 225, 245, 248, 408.

Never very common. The Falkland type is very constant in its circular shape from which there is little variation, except in the height of the shell. At many stations a direct connection between the height and the size of the proloculum can be observed, the microspheric stage being high, and the megalospheric low and depressed, sometimes almost scale-like. This connection can be seen best at WS 88, where the species attains its maximum development of size (up to 0·80 mm. in diameter) and is most frequent. The megalospheric proloculum is often prominent here, as a bead standing above the contour of the test (fig. 22). The microspheric proloculum (fig. 21) is generally followed by a greater length of unseptate tube than the megalospheric; instances showing as much as two to four distinct convolutions of unseptate tube have been observed.

327. **Patellina corrugata var. formosa**, var.n. (Plate XIII, figs. 23–25).

Three stations: WS 88, 90, 92.

A few specimens at each station, the best at WS 88. Test large, hyaline, nearly circular in plan, rather depressed or scale-like, ventral side flat, dorsal side convex, becoming less convex towards the margin. Following the proloculum which is large, and either globular or reniform, is a simple flattened tube, about 0·08 mm. in diameter, wound in a spreading spiral of about three convolutions, which occupy from about one-third to

one-half the dorsal side (fig. 23). The tube is fimbriated, or broken up by solid partitions starting from the outer edge of the tube and separating it into finger-shaped or forked pockets, which give a very ornamental appearance to the test. After about three convolutions the test assumes the normal patelline mode of growth, and, except for size and distinctness of markings does not differ from Williamson's Type.

Diameter, up to 0·70 mm.

It is not uncommon to find specimens of *P. corrugata* in which the early portion of the test following the proloculum consists of an undivided tube, but it is rare to see more than one or two convolutions of the spiral, and we have never before met with specimens in which the spiral portion is fimbriated. The fimbriations are similar in nature to those causing the markings which give its characteristic appearance to the dorsal view of *P. corrugata*.

Genus Patellinoides, gen.n.

Test free and conical, more or less depressed, more or less oval in plan, commencing with a proloculum, followed by a simple spiral chamber of 1–2 convolutions; the growth then becomes alternate, crescentiform chambers being arranged opposite to one another as in *Patellina corrugata*, but remaining entire throughout the growth. There are no internal septa dividing the chambers into chamberlets, but the outer margins of the chambers on the dorsal side are sometimes marked by an irregularly scattered line of minute dots, which look like perforations, but in balsam and under a high power appear to be pillars of solid shell-substance, which may represent vestigial secondary septa. The ventral side is slightly concave, filled with a glassy shell-substance, to one side of the centre of which is a small arched aperture communicating with the final chamber, apparently by a curved tube. The aperture is alternately to the right and left of the centre, and facing in opposite directions with the addition of each chamber.

Several authors (e.g. B. 1884, FC, p. 633; C, 1928, F, p. 268) have referred to the existence of specimens of *Patellina* without divisions to the chambers. It is not clear whether they are referring to *P. corrugata*, Will., or to the very minute *P. campanaeformis* (B. 1884, FC, p. 634, Text-fig. 19). At any rate we are not aware of any figures of unseptate specimens other than *P. campanaeformis*, which is an organism of such extreme rarity that it is unlikely to have come under frequent observation. Cushman, it is true, in 1928, created a genus *Patellinella* in which the chambers alternate, two to a whorl, and are free from secondary septa. But it is based on *Textularia inconspicua*, Brady, an organism of somewhat doubtful affinities, but probably not closely related to *Patellina*.

Unseptate *Patellinae* do however exist, though they are extremely rare by comparison with the ubiquitous *P. corrugata*. For many years past we have met with an occasional example in British gatherings, but have hitherto regarded them as abnormal individuals of the type. The occurrence of two very distinct forms in the Falkland material, and in sufficient numbers to indicate their character, has forced us to the conclusion that the form must be recognized as generically distinct. There are no transition forms in the Falkland material, in which *Patellina corrugata* is very generally distributed and very true to type.

Patellinoides we take to be intermediate between *Spirillina* and *Patellina*. The latter genus is obviously a derivative of *Spirillina*, and the proloculum is normally followed by a simple unseptate tube which may attain to as many as four convolutions before the secondary septa begin to form. But we take the view that *Patellinoides* is probably not on the line of evolution between *Spirillina* and *Patellina*, but is more likely to be a degeneration from the latter genus, in which the alternate plan of growth has been preserved and the secondary septa have been abandoned. This theory is perhaps best supported by the fact that balsam-mounted specimens under high magnification sometimes show a line of minute beads round the peripheral edge of some of the chambers, which beads may represent vestigial septa.

Patellina campanaeformis, Brady, should on the diagnosis of Brady be transferred to *Patellinoides*. But it is quite possible that it represents yet another separate and undescribed genus. It is unlike either of our species, and nothing is known of the organism beyond what Brady has written.

328. **Patellinoides conica**, sp.n. (Plate XIII, figs. 26–29).

Three stations: WS 88, 92, 408.

Test conical, oval in plan, high-domed, the proloculum and spiral tube being followed by a succession of alternate, undivided chambers, up to five to six pairs, which are placed somewhat diagonally across the long axis of the oval base. Sutural lines distinct but flush. The minute dots which, when viewed under a high power, are seen to be scattered round the lower peripheral edge of the chambers are apparently solid pillars of shell substance inside the chambers. Seen through the glassy shell they have the appearance of a line of pores.

Average length, 0·20 mm.; breadth, 0·13 mm.; height, 0·05 mm.

P. conica occurs at WS 408 at 454 m. It is rare, but many specimens were found. Very rare at the other stations. It appears to be identical with specimens in our cabinet from Plymouth, and from the Faroe Channel, and the species is therefore probably of very wide distribution. The British specimens are larger than those from the Falklands, and the peripheral pores are more distinct, but they show no evidence of the definite septation proper to *Patellina*.

329. **Patellinoides depressa**, sp.n. (Plate XIII, figs. 30–33).

Four stations: 388; WS 88, 245, 408.

Test free, a long oval in plan, conical, but very depressed or scale-like, consisting of a proloculum followed by a short simple tube, then by unseptate chambers arranged alternately to the number of 3–5 pairs. Each chamber surrounded by a carina which persists in the form of strongly limbate sutural lines. Texture hyaline.

Length, up to 0·40 mm.; breadth, 0·25 mm.; height, 0·04 mm.

Very rare, but a good many specimens have been found, principally at 388 and WS 88. They appear to be identical with two specimens in our cabinet from the Faroe-Shetland Channel at 128 m., and the species may therefore have a very wide distribution.

Genus Discorbis, Lamarck, 1804

330. **Discorbis cora** (d'Orbigny) (Plate XIII, figs. 34–36).

Rosalina cora, d'Orbigny, 1839, FAM, p. 45, pl. vi, figs. 19–21.
Discorbina cora, Heron-Allen and Earland, 1922, FGA, p. 133, pl. i (numbered pl. ii), figs. 33–5.

Four stations: 51, 388; WS 88, 93.

This very pauperate form described by d'Orbigny from the Peruvian coast, where it was rare, is extremely rare in the Falkland area. Two quite typical specimens at WS 88 (greatest breadth, 0·38 mm.), and single very good specimens were found at 388 and WS 93, less typical at 51. The specimens from WS 88 are practically identical with d'Orbigny's figure, and there can be no question as to their discorbine affinities. The *Truncatulina cora* (d'Orbigny) of Cushman (1922, FTR, p. 48, pl. vii, figs. 3–5; 1925, FTCP, p. 133) appears to be quite a different organism, having little resemblance to d'Orbigny's figure. The Type could not be found in Paris.

331. **Discorbis globularis** (d'Orbigny).

Rosalina globularis, d'Orbigny, 1826, TMC, p. 271, pl. xiii, figs. 1–4, Modèle no. 69.
Discorbina globularis, Möbius, 1880, FM, p. 96, pl. ix, fig. 18.
Discorbina globularis, Brady, 1884, FC, p. 643, pl. lxxxvi, figs. 8, 13.

Thirteen stations: 51, 53, 388; WS 84, 88, 89, 90, 92, 97, 215, 217, 225, 408.

Not particularly abundant except at some stations, notably WS 88, where it was abundant, large, and well developed. The type here is very compressed in contrast to those at WS 225, which are very highly domed. Often sessile on Algae and Polyzoa.

332. **Discorbis mediterranensis** (d'Orbigny).

Rosalina mediterranensis, d'Orbigny, 1826, TMC, p. 271, no. 2.
Discorbina mediterranensis, Fornasini, 1898, RFI, p. 264 (text-fig).
Discorbina mediterranensis, Heron-Allen and Earland, 1913, CI, p. 118, pl. ix, figs. 12–14; pl. x, fig. 1.

Seven stations: WS 79, 83, 91, 97, 221, 225, 248.

Sparingly distributed and never very common. Very good specimens at WS 97 and 221. The Paris Types are quite unrecognizable.

333. **Discorbis vilardeboana** (d'Orbigny) (Plate XIII, figs. 37–39).

Rosalina vilardeboana, d'Orbigny, 1839, FAM, p. 44, pl. vi, figs. 13–15.
Discorbina vilardeboana, Brady, 1884, FC, p. 645, pl. lxxxvi, figs. 9, 12.
Discorbis vilardeboana, Cushman, 1910, etc., FNP, 1915, p. 14, text-fig. 14, pl. ix, fig. 2.

Five stations: 388; WS 71, 83, 88, 93.

This is one of d'Orbigny's species from the Falkland Islands, where he describes it as rare. It is probably widely distributed and has been more or less overlooked among the many varieties of *D. rosacea* occurring in the Discovery material. But records have been kept of its occurrence at these four stations, at all of which d'Orbigny's typical form is common and well developed. Average breadth, 0·33 mm.; height, 0·17 mm.

We figure specimens which have been compared with the Type in Paris, and are identical. D'Orbigny's figure is not particularly good—the punctation appearing as too marked. The test is hyaline and very finely punctate, and the characteristic feature is the very large and pronounced terminal chamber.

334. **Discorbis rosacea** (d'Orbigny).

Rotalia rosacea, d'Orbigny, 1826, TMC, p. 273, no. 15, Modèle no. 39.
Rotalia rosacea, Parker, Jones and Brady, 1859, etc., NF, 1865, p. 25, pl. ii, fig. 71.
Discorbina rosacea, Brady, 1884, FC, p. 644, pl. lxxxvii, figs. 1, 4.

Twenty-six stations: 48, 51, 388; WS 71, 73, 76, 77, 80, 83, 84, 86, 88, 89, 90, 91, 92, 95, 97, 99, 210, 213, 217, 221, 225, 245, 248.

Universally distributed, often very abundant. The best stations probably 51, WS 71, 83, 84, 91 and 225. Often very variable, though the general form is rather high-domed. At WS 217 the type is lower and more squamous. Sessile at many stations, especially 51.

335. **Discorbis peruviana** (d'Orbigny) (Plate XIV, figs. 1–4).

Rosalina peruviana, d'Orbigny, 1839, FAM, p. 41, pl. i, figs. 12–14.
Discorbina peruviana, Heron-Allen and Earland, 1913, CI, p. 122, pl. xi, figs. 1–3.

Three stations: 48, 51; WS 245.

Few specimens but good examples at WS 245. D'Orbigny's original record was from the Bolivian coast. In Paris, the Type tube from Acapulco contains four specimens, three of them are decomposed and unrecognizable, and the fourth is a typical *Discorbina globularis*.

Average breadth, 0·40 mm.; height, 0·10 mm.

336. **Discorbis araucana** (d'Orbigny).

Rosalina araucana, d'Orbigny, 1839, FAM, p. 44, pl. vi, figs. 16–18.
Discorbina araucana, Brady, 1884, FC, p. 645, pl. lxxxvi, figs. 10, 11.
Discorbina araucana, Egger, 1899, KOA, p. 163, pl. xxv, figs. 22–4.

Seven stations: 53, 228; WS 83, 84, 86, 88, 408.

Specimens which appear to be attributable to d'Orbigny's species occur sparingly, but are not very typical. The original record was from the Chilean coast. The d'Orbigny Type is a dead shell of thick white texture, the structure rather obscure, but generally agreeing with d'Orbigny's figures.

337. **Discorbis praegeri** (Heron-Allen and Earland).

Discorbina praegeri, Heron-Allen and Earland, 1913, CI, p. 122, pl. x, figs. 8–10; 1914, etc., FKA, 1915, p. 692; 1916, FWS, p. 270; 1916, FSC, p. 50.

Nine stations: WS 71, 76, 80, 91, 93, 213, 217, 221, 245.

This form of *D. rosacea*, characterized by a solid, prominent, umbilical stud, is often very common in the Falkland gatherings, notably at WS 91 and 93, where large and typical specimens occur in considerable numbers.

338. **Discorbis isabelleana** (d'Orbigny) (Plate XIV, figs. 5–8).

Rosalina isabelleana, d'Orbigny, 1839, FAM, p. 43, pl. vi, figs. 10–12.

Thirteen stations: 388; WS 76, 83, 84, 86, 87, 88, 91, 97, 225, 245, 246, 248.

This is one of the largest and most handsome of the Falkland species. It is usually represented by a few worn and dead shells only, but was common at WS 246 where it reached a large size, and still more abundant at 388 where the specimens were variable and handsome, owing to the development of tubercular ornament on the dorsal surface. Equally varied, but less abundant, at WS 88 and 225. Sessile specimens were seen at WS 225 and 246. There is great variation in the degree of convexity of the dorsal side, which is sometimes almost flat. The dorsal surface also varies, from glassy smoothness to rough, according to the amount of limbation and development of solid beads of shell. The ventral surface is invariably smooth and glassy, the umbilical cavity often more or less filled with solid beads of shell-substance or projections from the umbilical margins of the chambers. But there is always a noticeable cavity, never a solid stud of shell-substance, such as is suggested by Brady's figure (B. 1884, FC, p. 646, pl. lxxxviii, fig. 1).

The punctation is extremely fine, not coarse, as suggested by d'Orbigny's figures which are extremely unsatisfactory, and must be regarded as responsible for most of the confusion which has arisen over his species. His description, on the other hand, is quite good, and, taken in conjunction with the measurements which he gives as 2 mm. diameter, should have obviated some of the errors which have arisen over the identity of his species.

Even so it is difficult to understand on what grounds Jones and Parker (J. & P. 1872, FFR, p. 115) assigned d'Orbigny's species to the company of his *Rosalina rugosa* and *Rosalina vilardeboana*, in the group of *Discorbina turbo*. This appears to have been the initial stage of an error, which since that date has continually recurred.

Brady, *loc. cit.*, follows suit with a description of *D. isabelleana* as a "*minute* (italics ours) thin shelled variety belonging to the *rosacea* group". His figure is not unlike d'Orbigny's, but the umbilical cavity is filled with a solid stud of shell matter. It represents a delicate little species, 0·75 mm. in diameter, not uncommon in coral sands, which we have recorded from several localities, following the Brady figures.

Egger's figure (E. 1893, FG, p. 386, pl. xv, figs. 36–8) is very poor, but the description and size 0·25 mm. are sufficient evidence that he was not dealing with d'Orbigny's species. He himself assigns his specimens to Brady's form.

Cushman's (C. 1910, etc., FNP, 1915, p. 15, pl. vi, fig. 1) figure appears to be even farther from the d'Orbignyan type. It represents a high conical shell with almost flat base. The size is again given as 0·25–0·40 mm. diameter.

Later papers, as, for example, those of Cushman (C. 1927, FWCA, p. 160, pl. iv, fig. 4), Cushman and Kellett (C. & K. 1929, WCSA, p. 9, pl. iii, fig. 12), Cushman and Valentine (C. & V. 1930, FGC, p. 23, pl. vi, figs. 6–8) show a remarkable diversity of figures, none bearing much resemblance to those of d'Orbigny, while the sizes recorded and the descriptions indicate that the organisms dealt with are various forms allied to

D. vilardeboana. Their sizes range between 0·25 and 0·50 mm. which alone would exclude them from *D. isabelleana*.

It is fortunate, in the circumstances, that the original Types have survived in good condition. The Type tube labelled "*Rosalina Isabelleana*, Îles Malouines" contains seven specimens of varying sizes; the largest, when perfect, probably exceeded 3 mm. in diameter. They represent a form with which we had become very familiar in the examination of our material, without, up to that time, associating it with d'Orbigny's figure. The definite punctation shown in the figures had misled us, as it had done others.

Apart from this punctation the figures, though weak, are not faulty, though they give a poor impression of a large and handsome species. They also fail to convey the fact, also overlooked in the descriptions, that the dorsal surface of the chambers, though sometimes smooth, is generally more or less roughened with studs of solid shell substance, which occasionally merge to form ridges of ornament approaching those found in *Heronallenia* (*Discorbis*) *kempii*. The perforations on the other hand are extremely minute, the shell being quite glassy in spite of its thickness.

The colour to which d'Orbigny alludes, "d'un rose violacé", has almost completely faded from the Types, but is a very noticeable feature in fresh specimens from our material. It is due to the chitinous lining of the chambers.

There can be no doubt that d'Orbigny's species is a well-marked and definite type. Beyond the few incorrect records which we have noted *supra* it appears to have no history as *isabelleana*. But we suspect that some records of *Pulvinulina repanda* var. *concamerata*, and possibly of *Pulvinulina punctulata*, would have been more correctly assigned to the species under consideration.

339. **Discorbis turbo** (d'Orbigny).

Rotalia (*Trochulina*) *turbo*, d'Orbigny, 1826, TMC, p. 274, no. 39, Modèle no. 73.
Discorbina turbo, Brady, 1884, FC, p. 642, pl. lxxxvii, fig. 8.
Discorbina turbo, Sidebottom, 1904, etc., RFD, 1908, p. 11, pl. iii, figs. 1, 2.

Fifteen stations: 48, 51; WS 77, 83, 84, 86, 87, 88, 89, 91, 97, 99, 225, 245, 248.

Generally distributed, often quite frequent. It attains a large size and very fine development at several stations, especially 48, WS 84 and 88. Limbate forms predominate at some stations, notably WS 83 and 248. No Type to be found in Paris.

340. **Discorbis nitida** (Williamson).

Rotalina nitida, Williamson, 1858, RFGB, p. 54, pl. iv, figs. 106–8.
Discorbina nitida, Sidebottom, 1904, etc., RFD, 1908, p. 13, pl. iv, fig. 6.
Discorbina nitida, Heron-Allen and Earland, 1916, FWS, p. 269, pl. xlii, figs. 26–30.

Ten stations: 51, 388; WS 87, 88, 89, 90, 91, 92, 221, 408.

Generally distributed, often very common. The best at WS 87, 88, 89, 90, particularly at WS 88. The Falkland type is rather more concave on the oral side than in British specimens, but has all the other characteristics of Williamson's form.

341. **Discorbis millettii** (Wright).

Discorbina millettii, Wright, 1910–11, ECM, p. 13, pl. ii, figs. 14–17.
Discorbina millettii, Heron-Allen and Earland, 1913, CI, p. 121, pl. x, figs. 5–7.

Four stations: 48; WS 84, 87, 88.

Never occurring in any numbers, but excellent specimens at WS 87 and 88.

342. **Discorbis plana**, sp.n. (Plate XIV, figs. 9–12).

Four stations: 388; WS 71, 87, 88.

Test nearly circular, highly polished, plano-convex, much compressed; peripheral margin sub-acute, but not carinate; superior surface exhibiting about three convolutions, 4–5 chambers in each, increasing somewhat rapidly in size, sutural lines recurved and flush but distinct; inferior surface depressed towards the umbilicus, exhibiting the chambers of the last convolution only, sutural lines somewhat depressed; the interior margins of the chambers on this side are rather plicated, and sometimes have a few beads in the umbilicus; aperture, a slit on the inner edge of the last chamber. Colour yellowish when young, becoming glassy white.

The size is very variable, large specimens range up to breadth, 0·50 mm.; height, 0·10 mm.

Not uncommon at 388 and WS 88, rarer at the other stations.

This is rather a striking species, and not very near any of the other local forms. It is perhaps most closely related to *D. nitida* and *D. millettii*, but cannot be confused with them. A specimen "budding" was found at WS 88 (fig. 12) and a sessile specimen at WS 87.

343. **Discorbis orbicularis** (Terquem).

Rosalina orbicularis, Terquem, 1875, etc., APD, 1876, p. 75, pl. ix, fig. 4.
Discorbina orbicularis, Brady, 1884, FC, p. 647, pl. lxxxviii, figs. 4–8.
Discorbina orbicularis, Balkwill and Wright, 1885, DIS, p. 349, pl. xiii, figs. 31–3.

Six stations: 388; WS 71, 84, 88, 89, 245.

This species, so abundant in the West Indies and Pacific and also widely distributed in higher latitudes, is strangely rare in the Falkland area. Moreover specimens are small and not very typical. Not uncommon at WS 88, and almost equally good at WS 245; a sessile specimen at WS 84.

344. **Discorbis tricamerata**, sp.n. (Plate XIV, figs. 13–16).

Three stations: 388; WS 88, 92.

Test free, hyaline, plano-convex; a depressed cone of two convolutions only, each consisting of three chambers rapidly increasing in size. On the dorsal side all the chambers are visible; they are slightly inflated, and separated by somewhat depressed, recurved sutural lines; on the ventral side only the three chambers of the final convolution are visible, slightly turgid and curving inwards to a large elongate and deeply sunk

umbilical area, within which the aperture, a loop-shaped slit, is situated under the inner edge of the final chamber. The sutural lines on the ventral side are short, nearly straight, and slightly depressed; the peripheral margin is sub-acute with a narrow, thickened edge on the dorsal side. Texture of the shell whitish, and opaque like ground glass on the dorsal side, very hyaline on the ventral side.

Length of largest specimens up to 0·30 mm.; breadth, 0·20 mm.; height, 0·10 mm.

Seven specimens of this very distinctive species were found at WS 88, and single good specimens at 388 and WS 92. It is quite unlike any other species known to us in the paucity of chambers forming its spiral.

345. **Discorbis bertheloti** (d'Orbigny).

Rosalina bertheloti, d'Orbigny, 1839, FIC, p. 135, pl. i, figs. 28–30.
Discorbina bertheloti, Brady, 1884, FC, p. 650, pl. lxxxix, figs. 10–12.
Discorbis bertheloti, Cushman, 1910, etc., FNP, 1915, p. 20, pl. vii, fig. 3.

Fifteen stations: 51, 388; WS 71, 77, 83, 86, 87, 88, 89, 90, 97, 99, 221, 245, 408.

Widely distributed but never very common. The best and most typical specimens occur at the range of stations WS 83–88, very fine at WS 86, and equally good at WS 221 and 245. The Paris Type is missing.

346. **Discorbis bertheloti** var. **baconica**, Hantken.

Discorbina baconica, Hantken, 1875, CSS, p. 76, pl. x, figs. 3 *a*, *b*.
Discorbina baconica, Brady, 1884, FC, p. 651, pl. xc, fig. 1.
Discorbina bertheloti var. *baconica*, Heron-Allen and Earland, 1916, FSC, p. 50, pl. viii, figs. 10–12.

Six stations: 388; WS 71, 86, 88, 91, 92.

This limbate variety is very much rarer than the type, but excellent specimens occur at 388 and WS 86, and one, extraordinarily limbate, at WS 91.

347. **Discorbis bertheloti** var. **complanata**, Sidebottom (Plate XIV, figs. 17, 18).

Discorbina bertheloti var. *complanata*, Sidebottom, 1918, FECA, p. 253, pl. vi, figs. 1–3.

One station: WS 88.

A few specimens only.

348. **Discorbis valvulata** (d'Orbigny).

Rosalina valvulata, d'Orbigny, 1826, TMC, p. 271, no. 4; 1839, FIC, p. 136, pl. ii, figs. 19–21.
Discorbis valvulata, Cushman, 1921, FNCJ, p. 59, pl. xiv, figs. 4–5.

One station: 51.

One fairly typical specimen. The species appears to be widely distributed. The Type is missing.

349. **Discorbis parisiensis** (d'Orbigny).

Rosalina parisiensis, d'Orbigny, 1826, TMC, p. 271, Modèle no. 38.
Discorbina parisiensis, Parker, Jones and Brady, 1866, etc., MFC, 1866, pl. ii, figs. 13–15; 1896, p. 296.
Discorbina parisiensis, Brady, 1884, FC, p. 648, pl. xc, figs. 5, 6, 9–12.

One station: WS 88.

Two small but fairly typical specimens at this station.

350. **Discorbis obtusa** (d'Orbigny) (Plate XIV, figs. 19–21).

Rosalina obtusa, d'Orbigny, 1846, FFV, p. 179, pl. xi, figs. 4–6.
Discorbina obtusa, Brady, 1884, FC, p. 644, pl. xci, fig. 9 *a*, *b*, *c* (?).
Discorbina obtusa, Cushman, 1918, SFP, p. 68, pl. xiii, fig. 1.

One station: WS 88.

A few excellent and typical specimens, identical with the Type in Paris. Breadth, 0·25 mm. Height, 0·15 mm.

351. **Discorbis malovensis**, sp.n. (Plate XIV, figs. 22–24).

Four stations: WS 71, 86, 88, 89.

Test circular, plano-convex, very finely perforate and polished; consisting of three or four convolutions each containing four (rarely five) narrow recurving chambers, increasing rapidly in size: peripheral edge entire (unbroken), subacute; dorsal surface highly polished and exhibiting all chambers, sutures recurved, flush but distinct; ventral side nearly flat, slightly sunk at the umbilicus, only the chambers of the final convolution visible, sutures recurved and rather depressed, distinct round the peripheral edge but largely obscured by a secondary deposit of beads covering all but the final chamber and the outer margins of the preceding chambers; aperture a curved slit under the anterior edge of the final chamber; colour yellowish to glassy white.

Dimensions up to 0·40 mm. in diameter; height about 0·10 mm.

A few specimens only from each Station, the best at WS 71, 86, 88. Many of them show signs of plastogamy but no actual pairs were seen.

The species is closely allied to *D. plana* sp.n. (No. 342) with which its distribution practically agrees, all the stations being confined to the southern areas. It differs from *D. plana* in its greater convexity, in the dome-like smoothness of the dorsal surface, and in its unbroken peripheral margin.

D. malovensis is allied both to *D. pileolus* (d'Orbigny) and to the very different organism figured by Brady under the name *D. pileolus* (d'Orbigny) (B. 1884, FC, p. 649, pl. lxxxix, figs. 2–4) and generally associated since with d'Orbigny's species. But it differs from Brady's organism in many features, notably in the lesser number of chambers to the convolution and its highly polished dorsal surface. The organism figured by Brady is a well known type in the Indo-Pacific Region and is of frequent occurrence in the New Zealand and Australian area. In the Northern Pacific it appears to be replaced by a somewhat similar organism which is found on American shores and has been described

by Cushman (C. 1925, etc., LFR, vol. 1 (1925), p. 42, pl. vi, figs. 11–12) as *D. ornatissima*. From their distribution, it seems possible that both *D. malovensis* and *D. plana* are species of Southern Pacific ancestry which have not as yet attained much extension on the Atlantic side of Cape Horn.

Brady's identification of his form with the *Valvulina pileolus* of d'Orbigny (d'O. 1839, FAM, p. 47, pl. i, figs. 15–17) has always seemed to us to be doubtful and can no longer be entertained. The Type of *Valvulina pileolus* could not be found in Paris, but by the courtesy of Prof. Marcellin Boule we were allowed to examine d'Orbigny's material from Arica, Peru, the original locality for the species. The sample was a coarse Molluscan and Echinoderm sand with very little fine material, in which, however, we succeeded in finding four specimens which are unquestionably d'Orbigny's organism. It is evident that his figures are much conventionalized, particularly the side view (fig. 17). The large boss shown in the basal view (fig. 16), to which may be attributed the incorrect assignation of the species to his genus *Valvulina* (he refers in his text to the "valvule arrondie, assez saillante"), was, almost certainly, a young attached specimen, or bud. The whole of the group of *Discorbis* characterized by beaded dorsal sides is subject both to budding and plastogamy, and two of our specimens from Arica show evidence of it in the shape of eroded umbilici.

D'Orbigny's species is thus found to be very different from the organism figured by Brady. It has but four or five chambers to the convolution as against eight or more in Brady's and in this respect is much nearer to *D. malovensis*, but it cannot be confused with either. The ventral aspect of d'Orbigny's species, with its rows of beads converging to a deeply sunk umbilicus, is very distinctive, and, except in the differing number of chambers, very suggestive of the base of *D. pulvinata*, Brady, another Pacific species. Altogether the *D. pileolus* of Brady is such a well marked form, and possesses such a definitely localized range, that it deserves specific separation, and we propose for it the new name *Discorbis australensis*.

352. **Discorbis chasteri** (Heron-Allen and Earland).

Discorbina minutissima, Chaster, 1892, FS, p. 65, pl. i, fig. 15.
Discorbina chasteri, Heron-Allen and Earland, 1913, CI, p. 128, pl. xiii, figs. 1–3.

Six stations: 388; WS 79, 83, 88, 92, 409.

This minute but very widely distributed species is not uncommon at WS 92, rare at the other stations. The specimens are quite typical and all of the round type. No oval or spinous forms were found.

353. **Discorbis coronata**, sp.n. (Plate XIV, figs. 25–30).

Two stations: WS 88, 245.

Test free, minute, hyaline, depressed, almost scale-like, inaequilateral, consisting of $1\frac{1}{2}$–2 convolutions with nine chambers in the final convolution; sutural lines distinct and curving, peripheral edge broadly carinate and recurved.

The dorsal side is convex, but flattened in the centre. The chambers of the outer

whorl rising at a sharp angle from the carina; at about half their width they are flattened out, and so continue to the inner margin. At the point of curvature there is a second carina, projecting upwards and running parallel to the peripheral edge. The sutural lines, which are flush between the two carinae, become limbate between the secondary carina and the inner margin, so that the inner half of each chamber is surrounded by a raised wall. Within these walls the surface of the test is rough, thus obscuring the earlier convolutions, which can, however, be made out on careful examination. Between the inner and outer carinae the shell surface is smooth and hyaline.

Owing to superficial ornament, only the chambers of the final convolution are exposed on the ventral side, which is flat and somewhat depressed at the umbilical region. This part of the test is thickly studded with minute beads of shell-substance. The aperture is obscure, but is believed to be a minute slit on the inner ventral side of the final chamber opening into the umbilical region.

Two or three specimens only were found at WS 88, and a single one at WS 245, both stations lying between Tierra del Fuego and the Falkland Islands. The structure will be most readily understood from the figures (figs. 25–27). The two specimens from WS 88 appear to be megalospheric; the nature of the third cannot be stated. The dimensions of the largest test are: greatest breadth, 0·30 mm.; least breadth, 0·25 mm.; thickness, 0·09 mm.

A single large specimen from WS 88 (greatest diameter, 0·40 mm.), which we also figure (figs. 28–30), may be abnormal, or it may be a further stage in the development of the species. The peripheral carina is much reduced and the inner carina has disappeared. The ventral area of the dorsal side is covered with oval pits surrounded by raised edges. Each pit apparently marks a chamber. From the pits a series of radiating grooves extends to the carina. The ventral side is very similar to our Type but the beaded ornament is only slightly developed.

The exact relationships of this remarkable organism must await the discovery of further material, as it is quite unlike anything with which we are acquainted. It has been tentatively assigned to *Discorbis* mainly on the evidence of its beaded base, but it has a general likeness to some Truncatulinae, such as *T. tenuimargo* and *T. altocamerata*, and might equally well have been assigned to that genus.

Genus **Heronallenia**, Chapman and Parr, 1931

354. **Heronallenia (Discorbis) kempii** (Heron-Allen and Earland) (Plate XVII, figs. 20–28).

Discorbis kempii, Heron-Allen and Earland, 1929, etc., FSA, 1929, p. 332, pl. iv, figs. 40–8.
Heronallenia kempii, Chapman and Parr, 1931, NAF, p. 236, pl. ix, figs. 6–8.

Eleven stations: 48, 388; WS 84, 86, 87, 88, 89, 91, 92, 93, 248 (see also p. 309).

Test free, perforate, white in colour, consisting of flattened chambers arranged in a rapidly expanding coil of at most $1\frac{1}{2}$ convolutions. On the dorsal side, which is rather convex, the marginal edges of the chambers are strongly limbate, and the whole surface between these limbations is decorated with exogenous beads and zig-zag ornament which conceal the arrangement of the earliest chambers. There appear to be about eight chambers

in the final convolution, perhaps twelve or thirteen in the whole shell. The peripheral edge is rounded and lobulate. On the ventral side, which is concave, the sutural lines are increasingly depressed with the growth of the shell, and the otherwise smooth surface is furrowed with lines converging on the oral aperture, which is situated in a depression and is a strongly arched opening (sometimes furnished with a tooth) at the centre of the inner marginal edge of the final chamber. There is a considerable amount of variation at different stations in the development of the external ornament and in the relations of length to breadth, but not sufficient, in our opinion, to justify even varietal separation.

One specimen found at WS 87, where the species occurs most frequently, has the dorsal side smooth, the sutural lines being limbate but almost flush. The arrangement of the chambers, which is usually obscured by the surface ornament, is easily made out in this specimen.

A complete series in all stages of growth was obtained at WS 87. There is no marked difference except in the strength of the ornament, which increases with age.

The dimensions vary between 0·24 mm. length, 0·2 mm. breadth in the smallest specimen found, and 1·4 mm. length, 1·05 mm. breadth in the largest, which is about 0·35 mm. in thickness.

We have pleasure in associating this species, which is perhaps the most striking of the new species of Foraminifera from the Falkland Islands, with the name of Dr Stanley Kemp, F.R.S., the Director of the "Discovery" Investigations.

Heronallenia (*Discorbis*) *kempii* occupies rather an isolated position, and a study of further material may necessitate the creation of a new genus.[1] It has little in common with other species of *Discorbis*, and the only species with which we are acquainted having any close affinity is *Discorbis pulvinulinoides*, Cushman (C. 1910, etc., FNP, 1915, p. 23, pl. vi, fig. 3), which was described by the author from "off Japan, 59 fms." Cushman's species resembles *H.* (*D.*) *kempii* in the structure of the ventral side, but differs in size, number of chambers, and markings. We have recorded some specimens from New Zealand and the Antarctic, with reservations, under the name *D. pulvinoides*[2] (H.-A. & E. 1922, TN, p. 206). They may be specifically distinct from *D. pulvinulinoides* and *H.* (*D.*) *kempii*, as probably are some allied organisms in our collection from other localities (Torres Straits; Stewart Island, New Zealand). On the other hand, the Miocene specimens described by us from the Moorabool River, Victoria, Australia (H.-A. & E. 1924, FQM, p. 172), under the name *Discorbina pulvinoides*,[2] Cushman, appear to be identical with that author's recent specimens from Japan.

The distribution of *Heronallenia* (*Discorbis*) *kempii* is very interesting. It occurs at 48, depth 105 m., and WS 84, 86, 87, 88, 89, 91, 92, 93, 248, at depths ranging between 23 and 191 m. The best series of specimens are from WS 86, 87, 88, where it attains splendid dimensions. At most other stations the specimens are small, poorly developed, and very rare. All these stations are situated within an area bounded by Cape Horn, the

[1] This entire paragraph was written in 1929 when the species was described as a *Discorbis*. For the subsequent change, see final paragraph.

[2] An obvious misprint.

Burdwood Bank, the Falkland Islands, and a line between the Falklands and Magellan Straits. It has not, so far, been discovered outside this area, and in view of the Pacific habitat of its allies, we can hardly doubt that it is a form of Pacific ancestry which has succeeded in weathering the Horn and establishing itself in the Atlantic Ocean, without as yet obtaining any wide distribution there.

We have, in the Pearcey Collection (which is now incorporated with ours), typical specimens of this species from the "Scotia" material, which appear to have escaped Pearcey's notice. They came from the Burdwood Bank, 56 fms. ("Scotia" stn. 346).

Since this species was described in 1929 (*ut supra*) Messrs Chapman and Parr have created a new genus *Heronallenia* for certain species of *Discorbis* and *Discorbina*, which they propose to separate, chiefly on account of the distinctive character of the aperture. The genotype is declared to be *Discorbina wilsoni*, Heron-Allen and Earland (H.-A. & E. 1922, TN, p. 206, pl. vii, figs. 17–19), and other species transferred to the new genus are *Discorbis kempii* (H.-A. & E. 1929), *D. pulvinulinoides* (Cushman, *ut supra*), *D. lingulata* (Burrows and Holland, 1895, J. P. & B. 1866, etc., MFC, 1895, pl. vii, fig. 33, text, 1896, p. 297), and *D. lingulata* var. *unguiculata* (Sidebottom, 1918, FECA, p. 256, pl. vi, figs. 12–14). We had no doubt as to the close relationships of *D. kempii*, *D. pulvinulinoides*, and *D. wilsoni*, but were not so convinced as regards *D. lingulata* and its variety, which we suspected of possessing a more complex internal structure connected with the dorsal vesicles distinctive of the species. But the authors, to whom we communicated our views, inform us that they have gone into this matter, and are convinced that the vesicles are really bead-like thickenings on the distal margins of the chambers, and that they see no reason for altering their views.

Genus **Truncatulina**, d'Orbigny, 1826

355. **Truncatulina refulgens** (Montfort).

Cibicides refulgens, Montfort, 1808–10, CS, 1, p. 122, 31^{me} genre.
Truncatulina refulgens, d'Orbigny, 1826, TMC, p. 279, no. 5, pl. xiii, figs. 8–11, Modèle no. 77.
Truncatulina refulgens, Brady, 1884, FC, p. 659, pl. xcii, figs. 7–9.

Twenty-seven stations: 48, 51, 228, 235; WS 71, 72, 76, 77, 79, 83, 84, 86, 87, 89, 90, 91, 92, 95, 97, 109, 213, 217, 243, 246, 248, 408, 409.

Very small specimens are quite common, but none of the very large individuals so common on the North Atlantic coasts occur. The best specimens are found at WS 97 and 248. Sessile individuals are not uncommon on Algae.

356. **Truncatulina lobatula** (Walker and Jacob) (Plate XIV, fig. 31).

Nautilus lobatulus, Walker and Jacob, 1798, AEM, p. 642, pl. xiv, fig. 36.
Truncatulina lobatula, Jones, Parker and Brady, 1866, etc., MFC, 1866, pl. ii, figs. 4–10, pl. iv, fig. 19; text and references, 1896, p. 304.
Truncatulina lobatula, Brady, 1884, FC, p. 660, pl. xcii, fig. 10; pl. xciii, figs. 1, 4, 5; pl. cxv, figs. 4, 5.

All stations except 228, 230; WS 72, 73, 76, 108, 109, 219, 243, 431, 432.

Almost universally distributed, but fading out at the deeper stations. It is often excessively abundant, and, as usual, exhibits extreme variability, according to the nature of its environment. Perhaps the best and most typical and regular specimens occur at WS 93. Sessile individuals have been recorded at several stations, some show signs of having been encysted. Abnormal and irregularly grown individuals are often very abundant. At WS 246, a very curious and interesting specimen, consisting of an aggregated mass of young individuals of varying sizes up to four to five chambers tightly bound together occurs. It is apparently the contents of a reproductive cyst which has disappeared, as the remains of an agglutinate covering are still visible.

357. **Truncatulina dispars**, d'Orbigny (Plate XIV, figs. 32–34).

Truncatulina dispars, d'Orbigny, 1839, FAM, p. 38, pl. v, figs. 25–7.

Twelve stations: 388; WS 71, 83, 86, 88, 91, 93, 95, 221, 225, 245, 248.

The pretty little species which d'Orbigny described from the Falklands as frequent ("mais pas rare") is fairly widely distributed in the gatherings, occurring not only on the Continental Shelf but also in deep water. Structurally it appears to be nothing else than a diminutive form of *T. lobatula*, but all the specimens are very typical; they show no sign of variation or of transition forms running into *T. lobatula* or *T. ungeriana*, and it would therefore appear to be a true and constant local species. The best specimens are at WS 71 and 88; at the latter station it is not uncommon. The Type could not be found in Paris.

Greatest diameter, about 0·30 mm.; height, 0·06 mm.

358. **Truncatulina variabilis**, d'Orbigny (Plate XIV, figs. 36–39).

Truncatulina variabilis, d'Orbigny, 1826, TMC, p. 279, no. 8.
Truncatulina variabilis, Brady, 1884, FC, p. 661, pl. xciii, figs. 6, 7.
Truncatulina variabilis, Sidebottom, 1904, etc., BFD, 1909, p. 2, pl. i, figs. 5, 6; pl. ii, figs. 1–3.

Twenty-three stations: 48, 51, 388; WS 71, 76, 83, 84, 86, 87, 88, 89, 90, 91, 92, 93, 97, 210, 213, 221, 225, 243, 246, 248.

Very generally distributed and often very common. D'Orbigny's species has no real specific value. In the generality of specimens, the variability is merely an index to the nature of the surface on which the animal has lived. This is best proved by the examination of sessile individuals which are quite common at some stations, notably WS 225 and 246. It will then be seen that the contour and arrangement of the chambers follows the line of least resistance, as the protoplasm spreads itself out over the surface of attachment. Disregard of this has led to the creation of what appears to us to be two unnecessary genera, one, *Cibicidella*, Cushman, 1927, the genoholotype of which is stated to be *T. variabilis*, d'Orbigny, though neither d'Orbigny nor the author state which of the innumerable Soldanian figures represents the type (S. 1789, etc., T, 1789, 1, p. 77, pls. lxix–xciii). Later, in 1930, Cushman and Valentine have created a further genus *Dyocibicides*, for those individuals in which the later chambers assume a roughly biserial arrangement (C. & V. 1930, FSC, p. 30, pl. x, figs. 1–3). Such specimens occur in numbers in the Falkland dredgings, notably at WS 76, 84 and 88.

A Type tube at Paris is labelled "*Truncatulina variabilis*, Magellan Straits", and contains some neat, elongate forms, still recognizable, the other specimens being decomposed.

359. **Truncatulina tenuimargo**, Brady.

Truncatulina tenuimargo, Brady, 1884, FC, p. 662, pl. xciii, figs. 2, 3.
Truncatulina tenuimargo, Heron-Allen and Earland, 1908 etc., SB, 1909, p. 680, pl. xx, fig. 2.

Eight stations: WS 71, 81, 89, 91, 93, 97, 99, 245.

An occasional specimen only at each station except WS 245, where a good many were found. They are practically identical with fig. 2 of Brady's original description.

360. **Truncatulina tenuimargo** var. **alto-camerata**, Heron-Allen and Earland.

Truncatulina tenuimargo, Brady, 1884, FC, p. 662, pl. xciii, fig. 2.
Truncatulina tenuimargo, Sidebottom, 1918, FECA, p. 257, pl. vi, figs. 20, 21.
Truncatulina tenuimargo var. *alto-camerata*, Heron-Allen and Earland, 1922, TN, p. 209, pl. vii, figs. 24–7.

Six stations: 48, 388; WS 88, 225, 245, 246.

Usually only a single specimen at each of these stations, with the characteristic highly inflated chambers typical of our variety. The best at WS 88 and 246.

361. **Truncatulina wuellerstorfi** (Schwager).

Anomalina wuellerstorfi, Schwager, 1866, FKN, p. 258, pl. vii, fig. 105.
Truncatulina wuellerstorfi, Brady, 1884, FC, p. 662, pl. xciii, figs. 8, 9.
Truncatulina wuellerstorfi, Cushman, 1910, etc., FNP, 1915, p. 34, pl. xii, fig. 3.

Ten stations: 228, 230, 235, 236; WS 99, 245, 246, 248, 408, 433.

All the stations at which it is recorded are in deep water, and it is moderately common at all of them except WS 245, where the only specimens are remarkably small. At 230 and 236, and WS 248 and 408, particularly large and fine specimens were obtained.

362. **Truncatulina akneriana** (d'Orbigny).

Rosalina akneriana, d'Orbigny, 1846, FFV, p. 156, pl. viii, figs. 13–15.
Truncatulina akneriana, Brady, 1884, FC, p. 663, pl. xciv, fig. 8.
Truncatulina akneriana, Flint, 1899, RFA, p. 333, pl. lxxvii, fig. 5.

Twenty-six stations: 48, 51, 53; WS 71, 72, 73, 76, 77, 79, 80, 83, 84, 86, 87, 88, 89, 91, 92, 93, 97, 99, 219, 221, 225, 245, 408.

Almost universally distributed, often very common. Most numerous and typical at WS 71, 83, 86, 87, 92, 93. Sessile specimens are quite common. The Type is missing.

363. **Truncatulina pseudoungeriana**, Cushman (Plate XIV, fig. 35).

Truncatulina ungeriana, Brady (*non* d'Orbigny), 1884, FC, p. 664, pl. xciv, fig. 9.
Truncatulina pseudoungeriana, Cushman, *U.S. Geol. Surv. Prof. Paper*, 129 E, 19, 22, p. 97, pl. xx, fig. 9.
Cibicides pseudoungeriana, Cushman, 1918, etc., FAO, 1931, p. 123, pl. xxii, figs. 3–7.

Forty stations: 48, 51, 53, 228, 230, 388; WS 71, 72, 73, 76, 77, 79, 80, 83, 84, 86, 87, 88, 89, 90, 91, 92, 93, 95, 97, 98, 99, 108, 109, 210, 213, 215, 217, 221, 225, 245, 246, 248, 408, 409.

Universally distributed, often very abundant, especially at WS 84, 87, 88, 91, 93, 97, 248, where the best sessile specimens were obtained. The tubes of zoophytes and small pebbles are often thickly covered with small sessile individuals, particularly at 51, 228, and WS 246. Wild growing specimens are not uncommon. At WS 83, an abnormal specimen, which we figure, with an accessory balloon-shaped chamber attached to the ventral side of the final chamber, occurred. A similar abnormality is figured in connection with *Rotalia soldanii* (?) d'Orbigny (S. 1918, FECA, p. 261, pl. vi, fig. 27).

364. **Truncatulina dutemplei** (d'Orbigny).

Rotalina dutemplei, d'Orbigny, 1846, FFV, p. 157, pl. viii, figs. 19–21.
Truncatulina dutemplei, Cushman, 1910 etc., FNP, 1915, p. 37, pl. xv, fig. 2.

One station: WS 86.

A single not very typical specimen, considerably smaller than the Type in Paris.

365. **Truncatulina haidingerii** (d'Orbigny).

Rotalina haidingerii, d'Orbigny, 1846, FFV, p. 154, pl. viii, figs. 7–9.
Truncatulina haidingerii, Brady, 1884, FC, p. 663, pl. xcv, fig. 7.

One station: WS 86.

One small, and very far from typical, specimen. The Type is missing.

366. **Truncatulina tumidula**, Brady.

Truncatulina tumidula, Brady, 1884, FC, p. 666, pl. xcv, figs. 8 *a*, *b*, *c*, *d*.
Truncatulina tumidula, Cushman, 1910, etc., FNP, 1915, p. 38, pl. xv, fig. 3.

Five stations: 235, 236; WS 83, 408, 433.

A few specimens of this minute deep-water form were found. They agree fairly well with Brady's types. Owing to its size it may have been overlooked at some of the other deep-water stations. Records, though few in number, show that it is widely distributed in the Atlantic and Pacific Oceans.

367. **Truncatulina bradyana** (Cushman).

Truncatulina pygmaea, Brady (*non* Hantken), B. 1884, FC, p. 666, pl. xcv, figs. 9, 10.
Pulvinulinella bradyana, Cushman, 1927, FWCA, p. 165, pl. v, figs. 11–13.

Nine stations: WS 86, 88, 90, 108, 109, 210, 217, 219, 225.

Often not uncommon, but the specimens are, as a rule, very small and pauperate, the best at WS 90 and 210. They all belong to the type so well figured by Brady (*ut supra*), but do not resemble the original figure of Hantken, which has a depressed umbilicus (*Truncatulina pygmaea*, von Hantken, 1875, CSS, p. 78, pl. x, fig. 8).

Genus **Anomalina**, d'Orbigny, 1826

368. **Anomalina semi-punctata** (Bailey).

Rotalina semi-punctata, Bailey, 1851, SAC, p. 11, pl. O, figs. 17–19.
Anomalina polymorpha, Costa, 1853, etc., PRN, 1856, p. 252, pl. xxi, figs. 7–9.

Anomalina polymorpha, Brady, 1884, FC, p. 676, pl. xcvii, figs. 3–6 (only).
Anomalina polymorpha, Heron-Allen and Earland, 1915, FKA, p. 712, pl. liii, figs. 2–5.
Anomalina semi-punctata, Cushman, 1918, etc., FAO, 1931, p. 106, pl. viii, figs. 1, 2.

Three stations: 48; WS 91, 97.

Only a single typical specimen of Costa's species, as characterized by spinous processes, was found at 48, and a few young and more doubtful specimens at WS 91 and 97.

The non-spinous form doubtfully ascribed by Brady (fig. 7) to this species is on the other hand sometimes very common. It appears to have much more in common with *A. coronata* than with *A. polymorpha*, and to be identical with *Truncatulina vermiculata*, d'Orbigny, which is obviously an *Anomalina* (see No. 369).

369. **Anomalina vermiculata** (d'Orbigny) (Plate XV, figs. 1–15).

Truncatulina vermiculata, d'Orbigny, 1839, FAM, p. 39, pl. vi, figs. 1, 2, 3.
Anomalina polymorpha, Costa (?), Brady, 1884, FC, p. 676, pl. xcvii, fig. 7.

Sixteen stations: 48, 388; WS 80, 83, 84, 86, 87, 88, 91, 92, 93, 97, 225, 245, 246, 248.

D'Orbigny's figures are very misleading and are probably responsible for the fact that his species, although very abundant in the Falkland area, and probably elsewhere, was never recorded again until 1927, when Cushman (C. 1927, FWCA, p. 177, pl. vi, fig. 11) figured a specimen from the west coast of America under the name of *Cibicides vermiculata* (d'Orbigny). His figure shows one view only, but the fact that he assigns his specimen to *Cibicides* is conclusive evidence that it is not d'Orbigny's species, which is an unquestionable *Anomalina*.

The Paris Types are contained in two separate tubes. One marked "Îles Malouines" must be disregarded. It contains some depressed, scale-like forms, which could not be identified with either d'Orbigny's description or figures. They probably represent an empirical attempt by some curator to identify unnamed specimens by comparison with d'Orbigny's plate. (It may be noted that d'Orbigny's figures of *T. vermiculata* are Nos. 1, 2 and 3 on plate vi, but are not at the top of the plate where they might be expected, but in the middle. The figures at the top of the plate are of *Truncatulina depressa* and *T. ornata*, both depressed species.) The second tube, which is labelled "Amérique méridionale", contains quite typical specimens of a form which is common in our material and deserving of particular notice.

In 1884, Brady (*ut supra*) figured a specimen which is undoubtedly d'Orbigny's species, under the name *Anomalina polymorpha*, Costa (?). His figure differs in many essential points from Costa's species, notably in the complete absence of marginal spines or processes, and in the more or less regularly involute mode of growth assumed by the adult shell.

D'Orbigny's description of *Truncatulina vermiculata* is, on the whole, good, and sufficient for the identification of his species when compared with the actual specimens, instead of with his figures. But it is based upon mature specimens, and as the species passes through very dissimilar stages in the course of growth, we supplement it with a full description.

Test, usually free, but often sessile, especially in the earlier stages; irregularly nautiloid in the adult form, exhibiting 8–9 chambers in the final convolution which partly enfolds the earlier growth; dorsal side convex, very coarsely punctate, the septation of the earlier chambers often obscured; the later chambers becoming inflated, and separated by sunken sutures as growth progresses, until in the last half convolution the shell becomes involute. The umbilical margins of the later chambers on the dorsal side are smooth and thick-walled. The ventral side is nearly flat, thick-walled, finely perforate, and glassy. The umbilical region is concave on both sides, but deeper on the ventral side; the aperture is a well-marked slit extending right round the inner face of the final chamber.

The stages of growth, both of the megalospheric and microspheric forms, have been identified. They present such varied aspects at different stages of growth that they might easily be mistaken for distinct species. In the megalospheric forms the proloculum is large and followed by three other chambers of equal size, the whole forming a quadrate test with rounded corners, thick-walled, and coarsely punctate on the dorsal side, with hardly noticeable sutural lines; on the ventral side it is thick-walled but smooth or glassy, the sutures rather depressed. The aperture is a small hole on the peripheral margin. In the next stage, chambers are added which rapidly increase in size and height, particularly on the dorsal side, the test becoming inaequilateral. As growth progresses the height of the chambers becomes more equally distributed on both dorsal and ventral sides, until finally, in edge view, the peripheral margin of the first convolution disappears in the middle of the slit-like aperture of the final chamber. The megalospheric form has only $1\frac{1}{2}$ convolutions with 8 chambers in the final convolution.

The microspheric form appears to be rare, and no very young individuals were observed. Balsam-mounted specimens, however, show that it commences with a very minute proloculum, followed by a large number of small chambers gradually increasing in size and inflation for two convolutions before entering upon the final convolution, which is similar to that of the megalospheric form. There is not any noticeable difference in the two adult stages.

As with many species of *Anomalina* and *Truncatulina*, the chitinous lining is very thick and dark in colour; the chambers are thus rendered very clear on the ventral side of the shell up to a considerable size. In the words of d'Orbigny: "La teinte est d'un rose violacé d'autant plus foncé qu'on s'éloigne de la dernière loge; le côté interne de chaque loge est aussi plus foncé".

Estimated diameter of microsphere, 0·01 mm.; of megalosphere, 0·08 mm. Microspheric young, one convolution about 0·44 mm. long; 0·36 mm. broad. Four-chambered megalospheric young, about 0·30 mm. long; 0·25 mm. broad; 0·15 mm. thick. Adult test averages about 1·20 mm. long, 1·0 mm. broad, 0·70 mm. thick at oral surface.

D'Orbigny recorded the species from the Falklands as "common", and also from his sounding off Cape Horn in 160 m. It is quite common at many of our stations, notably WS 83, 84, 88, 91, 93, 246, and sessile specimens in all stages of growth are of frequent occurrence.

Anomalina vermiculata bears much more resemblance to *A. coronata*, Parker and Jones, than it does to *A. polymorpha*, Costa, to which species Brady doubtfully attributed his Bermuda specimen. In fact large specimens of *A. vermiculata* can best be separated from *A. coronata* by the narrow width of their peripheral edge when looking at the apertural face, compared with the broad edge of *A. coronata*. Young individuals, on the contrary, are quite distinctive in appearance as compared with *A. coronata*, but bear some resemblance to *A. grosserugosa*, Gümbel, so far as the dorsal surface is concerned, though differing in the ventral aspect.

It is possible that *A. vermiculata* has a more southerly distribution than *A. coronata*. Brady's figure 7 on Plate 97, *Anomalina polymorpha* (?), was drawn from a specimen dredged off Bermuda at 435 fms. His figured specimens of *A. coronata* are from Prince Edward's Island and the Canary Islands. The majority of the records of *A. coronata* are from northern seas, and although Brady gives some southern records for that species, including the Falkland Islands, it is impossible to say, without examination of his specimens, to what extent *A. vermiculata* figures among them. If, as seems possible, the specimens figured by Cushman and Wickenden (C. & W. 1929, FJF, p. 14, pl. vi, figs. 6 *a*, *b*, *c*) from Juan Fernandez Island under the name "*Anomalina* (?) species" are *A. vermiculata*, the range of the species extends into the Pacific also.

At WS 246, close to the Falkland Islands, but outside the Continental Shelf, a very interesting specimen was found, in which the final chamber terminated in a cyst formed of very fine mud, which cyst was tightly packed with a young brood of individuals, each apparently consisting of a proloculum and one or two subsequent chambers (fig. 15). It is presumably a case of the formation of a young brood by the *Anomalina*, but, in the present state of our knowledge, one cannot be certain that the cyst and its contents do not represent a separate organism, which had become attached to the *Anomalina*.

370. **Anomalina coronata**, Parker and Jones.

Anomalina coronata, Parker and Jones, 1857, FCN, p. 294, pl. x, figs. 15–16.
Anomalina coronata, Brady, 1884, FC, p. 675, pl. xcvii, figs. 1, 2.
Anomalina coronata, Cushman, 1910, etc., FNP, 1915, p. 47, pl. xviii, fig. 5.

Three stations: WS 88, 90, 93.

Represented by single typical specimens only at each station. The original figure of Parker and Jones represents a form in which, even at its narrowest point, the peripheral edge is flat and broad throughout, and coarsely perforated. The two surfaces of the shell are comparatively devoid of perforations. Since the original publication, figures of the species have often shown a narrowing of the edge of the earlier chambers of the last convolution. This may be due to confusion of a northern species *A. coronata* with the distinctive southern form described under the name of *A. vermiculata*.

371. **Anomalina sinuosa**, Sidebottom.

Anomalina sinuosa, Sidebottom, 1918, FECA, p. 258, pl. vi, figs. 22–5.
Anomalina sinuosa, Heron-Allen and Earland, 1922, TN, p. 213.

One station: WS 93.

A single good specimen at this station, which is just within the edge of the Continental Shelf to the west of the Falkland Islands at 133 m. The occurrence of this species so far from its original habitat off the East coast of Australia is very striking. The only other records we know are our own from the Terra Nova Expedition material, between the south end of New Zealand and the Antarctic.

372. **Anomalina umbilicatula**, sp.n. (Plate XIV, figs. 40–42).

Fourteen stations: 228, 230, 235, 236; WS 91, 99, 210, 215, 217, 245, 248, 408, 409, 433.

Test free, almost exactly symmetrical and involute, consisting of $1\frac{1}{2}$–2 convolutions with 12–15 chambers in the final convolution; peripheral edge entire, narrow, rounded. Sutural lines curving very distinctly, slightly swollen, much broader at the umbilicus than at the periphery; surface of the chambers coarsely punctate; both umbilici depressed; apertural face heart-shaped; aperture a V-shaped narrow slit on the inner edge of the final chamber. Colour, white, glassy and highly polished.

Width, 0·30–0·50 mm.; breadth, 0·28–0·38 mm.; thickness at oral face, 0·15 mm.

This handsome form is not uncommon at several stations, the best series being at WS 408 and the four "Discovery" stations. All the stations at which it was recorded are either outside or just within the Continental Shelf. It so strongly resembles some large varieties of *Nonion umbilicatula* (Montagu) that it might easily pass for that species but for its size and the flare of the umbilical recess, sometimes slightly revealing the inner extremities of the previous convolution.

It belongs to the group of *Anomalina ammonoides*, Reuss, but differs in its umbilical region, which is so nearly closed that hardly any part of the previous convolution is exposed. Many more or less involute *Anomalinae* have been described, but none of them appear to meet all the features of the Falkland form. Perhaps its nearest relation is *Anomalina complanata*, Reuss (R. 1851, FKL, p. 36, pl. iii, fig. 3) which resembles our form in the number and markings of the chambers, but is not bilaterally symmetrical and has a sharper peripheral edge and a more open umbilical region.

Genus **Carpenteria**, Gray, 1858

373. **Carpenteria lobosa**, sp.n. (Plate XV, fig. 19).

One station: WS 225.

Test large, adherent, very thin-walled especially at the surface of attachment, spreading over a branchlet of *Cellaria* sp. which it almost encircles in its growth, consisting of a few (number uncertain) of irregularly formed, dichotomously branching chambers, spreading over each other in a roughly spiral fashion, and extending at the extremities into finger-like processes closed at the ends. From the summit of the final chamber a tube extends in the direction away from the periphery. This tube, which is not vertical but horizontal, and lies in a depression between two of the earlier chambers, appears to be the principal aperture. The surface of the thin walls is polished but pustular in appearance, owing to the presence of great numbers of minute irregularly shaped papillae formed of shell-substance. The colour of individual chambers varies from pale yellow to

glassy white, but the colour is probably due to protoplasmic contents, as it is most marked in the final chamber.

Breadth of specimen, about 3·6 mm.

A single almost perfect specimen, and a fragment only were found in spite of exhaustive search among the trawl refuse from WS 225, at a depth of 162 m., but the species being sessile on zoophytes may be of more frequent occurrence than our single specimen suggests. Pending the arrival of further material, we have placed the form in the genus *Carpenteria*. It appears to have some affinities with *C. monticularis*, Carpenter, in the arrangement of its chambers and its tubular aperture, but differs very widely in its delicate shell-wall and in the lobose subdivision of the separate chambers.

Genus **Globorotalia**, Cushman, 1927

374. **Globorotalia (Pulvinulina) hirsuta** (d'Orbigny).

Rotalina hirsuta, d'Orbigny, 1839, FIC, p. 131, pl. i, figs. 37–9.
Pulvinulina canariensis, Brady (*non* d'Orbigny), B. 1884, FC, p. 692, pl. ciii, figs. 8–10.
Pulvinulina canariensis, Cushman, 1910, etc., FNP, 1915, p. 56, pl. xxiii, fig. 1.
Globorotalia hirsuta, Cushman, 1918, etc., FAO, 1931, p. 99, pl. xvii, figs. 6 *a–c*.

Ten stations: 53, 228, 236, 388; WS 76, 88, 90, 92, 245, 409.

Rare, and never very typical; all the specimens are small. This station is considerably to the south of 46° 40′ 00″ S which Brady gives as the southern limit of the species as identified by him. But he appears to have regarded *Rotalina hirsuta* as identical with *R. canariensis*, and to have adopted the latter name. D'Orbigny's figures and description indicate some marked differences, especially as regards size, and Cushman appears to be justified in reviving d'Orbigny's earlier name *R. hirsuta*, which is unmistakably the type so abundant all over the Atlantic Ocean. There is unfortunately no Type of *R. hirsuta* to be found in Paris, and the Type tube marked *R. canariensis* contains only a dead shell, opaque and obscurely marked, which throws no light upon the identity of d'Orbigny's *R. canariensis*. A single feeble specimen occurs at WS 92, which might be ascribed to *P. canariensis*, on the strength of the borders to the chambers on the dorsal side. All the other specimens are clearly *R. hirsuta*, characterized by the four chambers visible on the ventral side.

375. **Globorotalia scitula** (Brady).

Pulvinulina scitula, Brady, 1882, FKE, p. 716.
Pulvinulina patagonica, Brady (*non* d'Orbigny), B. 1884, FC, p. 693, pl. ciii, fig. 7.
Pulvinulina scitula, Balkwill and Millett, 1884, FG, p. 85, pl. iv, fig. 12 (revision *P. patagonica*, p. 4).
Globorotalia scitula, Cushman, 1927, FWCA, p. 175.

Five stations: 235; WS 88, 89, 225, 408.

Usually a few specimens only, the best at WS 88. The Falkland Islands specimens represent a common and widely distributed type, found in *Globigerina* oozes and

occasionally in in-shore deposits, all over the world. It is unfortunate that Brady, having first described this form as a distinct species, should subsequently have confused it with a quite distinct d'Orbignyan type. Yet a third form has been brought into the question, which we have figured and described in our South Cornwall paper. This third form, as suggested by us, is probably the same as Terquem's *Rotalina excavata*. We are now convinced that it differs from d'Orbigny's species, and from Brady's (see H.-A. & E. 1916, FSC, p. 51, pl. ix, figs. 2–5).

376. **Globorotalia (Pulvinulina) crassa** (d'Orbigny).

Rotalina crassa, d'Orbigny, 1840, CBP, p. 32, pl. iii, figs. 7, 8.
Pulvinulina crassa, Cushman, 1910, etc., FNP, 1915, p. 58, pl. xxvii, fig. 1.
Globorotalia crassa, Cushman, LFR, IV, 1927, p. 75.

Nine stations: 48, 388; WS 90, 92, 245, 409, 431, 432, 433.

Rare; occasional specimens only, the best at 48. These stations are within, but very close to, the southern limit of the species, which Brady gives as 53° 50′ 00″ S. The Type is missing.

377. **Globorotalia (Pulvinulina) truncatulinoides** (d'Orbigny).

Rotalina truncatulinoides, d'Orbigny, 1839, FIC, p. 132, pl. ii, figs. 25–7.
Rotalina micheliniana, d'Orbigny, 1840, CBP, p. 31, pl. iii, figs. 1–3.
Pulvinulina micheliniana, Brady, 1884, FC, p. 694, pl. civ, figs. 1–2.
Pulvinulina truncatulinoides, Rhumbler, 1900, NPF, p. 17, figs. 16–18.
Globorotalia truncatulinoides, Cushman, 1927, FWCA, p. 176.

Twenty-two stations: 48, 228, 230, 235, 236, 388; WS 83, 86, 87, 88, 89, 90, 91, 92, 93, 99, 225, 245, 248, 408, 432, 433.

Very unevenly distributed so far as frequency is concerned. At many of the stations it is represented by one or two specimens only, at others, notably 236 and WS 91, 245, 248, it is more or less plentiful, very frequent at WS 433. As a rule the specimens are small, and often very thin-walled, but at 228, 235, 236, WS 88, 432, the normal thick-walled type occurs. The Type could not be found in Paris.

378. **Globorotalia (Pulvinulina) menardii** (d'Orbigny).

Rotalia menardii, d'Orbigny, 1826, TMC, p. 273, No. 26, Modèle no. 10.
Pulvinulina menardii, Brady, 1884, FC, p. 690, pl. ciii, figs. 1, 2.
Globorotalia menardii, Cushman, 1927, FWCA, p. 175.

One station: WS 89.

Three specimens only were found at this station, which is in shallow water close to the entrance to the Magellan Straits—53° 01′ 00″ S, 68° 07′ 00″ W is its exact position. This is just south of the extreme southern boundary recorded by Brady for this species, 51° 36′ 00″ S in the South Atlantic. The specimens are much smaller than the average of bottom specimens, and one of them is apparently pelagic. The Type could not be found in Paris.

379. **Globorotalia (Pulvinulina) tumida** (Brady).

Pulvinulina menardii var. *tumida*, Brady, 1877, FNB, p. 535.
Pulvinulina tumida, Brady, 1884, FC, p. 692, pl. ciii, figs. 4–6.
Globorotalia tumida, Cushman, 1927, FWCA, p. 175.

One station: WS 245.

A single small and very feeble specimen.

Genus Pulvinulina, Parker and Jones, 1862

380. **Pulvinulina auricula** (Fichtel and Moll).

Nautilus auricula, var. *a*, Fichtel and Moll, 1798, TM, p. 108, pl. xx, figs. *a, b, c*.
Pulvinulina auricula, Goës, 1882, RRCS, p. 109, pl. viii, figs. 273–5.
Pulvinulina auricula, Brady, 1884, FC, p. 688, pl. cvi, fig. 5.

Seven stations: 388; WS 71, 83, 88, 92, 93, 221.

Rare and very small, the best specimens at WS 92 and 93.

381. **Pulvinulina haliotidea**, Heron-Allen and Earland.

Pulvinulina haliotidea, Heron-Allen and Earland, 1908, etc., SB, 1911, p. 338, pl. xi, figs. 6–11; 1913, CI, p. 136; 1916, FWS, p. 276.
Lamarckina haliotidea, Cushman, 1918, etc., FAO, 1931, p. 36, pl. vii, figs. 8, 9.

Six stations: 48; WS 87, 88, 92, 217, 408.

Occasional specimens only at each station; the best were seen at WS 92 and 217.

382. **Pulvinulina brongniartii** (d'Orbigny).

Rotalia brongniartii, d'Orbigny, 1826, TMC, p. 273, no. 27; 1846, FFV, p. 158, pl. viii, figs. 22–4.
Pulvinulina brogniarti (*sic*), Hantken, 1875, CSS, p. 78, pl. ix, fig. 5 (*P. budensis* in plate).

Five stations: 48; WS 86, 89, 90, 92.

Represented by single specimens at most stations. Limbate at WS 86 and 90, small and depressed at WS 92.

383. **Pulvinulina berthelotiana** (d'Orbigny).

Rotalina berthelotiana, d'Orbigny, 1839, FIC, p. 130, pl. i, figs. 31–3.
Pulvinulina berthelotiana, Brady, 1884, FC, p. 701, pl. cvi, figs. 1 *a–c*.
Pulvinulina berthelotiana, de Amicis, 1893, CFP, p. 455, pl. iii, figs. 12 *a–c*.

Two stations: 51; WS 86.

Very rare but fairly typical specimens at WS 86. The Type could not be found in Paris.

384. **Pulvinulina concentrica**, Parker and Jones.

Pulvinulina concentrica, Parker and Jones (MS.), Brady, 1864, RFS, p. 470, pl. xlviii, fig. 14.
Pulvinulina concentrica, Brady, 1884, FC, p. 686, pl. cv, fig. 1.
Pulvinulina concentrica, Heron-Allen and Earland, 1908, etc., SB, 1909, p. 683, pl. xx, fig. 4 *a–c*.

Two stations: 388; WS 88.

Very rare, but the specimens are large and quite typical. Exceptionally fine at 388.

385. **Pulvinulina elegans** (d'Orbigny).

Rotalia (Turbinulina) elegans, d'Orbigny, 1826, TMC, p. 276, no. 54.
Rotalia partschiana, d'Orbigny, 1846, FFV, p. 153, pl. vii, fig. 28–30 and pl. viii, figs. 1–3.
Pulvinulina elegans, Brady, 1884, FC, p. 699, pl. cv, figs. 4–6.
Epistomina elegans, Cushman, 1925, etc., LFR, III, 1927, p. 182, pl. xxxi and xxxii.

Eleven stations: 228, 230, 235, 236; WS 73, 76, 86, 90, 99, 408, 433.

Large and perfectly typical specimens are numerous at 228, 230, 235, 236 and WS 408, all beyond the Continental Shelf. From the remaining stations, all of which except WS 99 are on the Shelf, only very small feeble specimens occur, which are referred with some hesitation to this species. The Type is missing.

386. **Pulvinulina umbonata** (Reuss) (Plate XV, figs. 16–18).

Rotalina umbonata, Reuss, 1851, FSUB, p. 75, pl. v, figs. 35 *a–c*.
Pulvinulina umbonata, Hantken, 1875, CSS, p. 77, pl. ix, fig. 8.
Truncatulina tenera, Brady, 1884, FC, p. 665, pl. xcv, fig. 11.
Pulvinulina umbonata, Brady, 1884, FC, p. 695, pl. cv, fig. 2 *a–c*.
Pulvinulina umbonata, Cushman, 1910, etc., FNP, 1915, p. 60, pl. xxvii, fig. 2.

Twelve stations: 228, 230, 235, 236; WS 88, 90, 99, 215, 217, 408, 409, 433.

Excellent specimens are found at all the stations, perhaps the best at WS 99. With the exception of WS 88, 90, 215, 217, all the stations are beyond the Continental Shelf. We had originally identified the majority of the specimens as *Truncatulina tenera*, Brady, but after a further close examination and a comparison with Brady's own mounts of the two species from adjacent localities off the west coast of Patagonia, we are unable to see any material, much less specific, difference between the two forms, and consider that Brady's species must lapse in favour of the earlier name of Reuss. Brady's specimens differ only in the fact that *T. tenera* is thin-walled and hyaline compared with *P. umbonata*.

387. **Pulvinulina exigua**, Brady.

Pulvinulina exigua, Brady, 1884, FC, p. 696, pl. ciii, figs. 13, 14.
Pulvinulina exigua, Cushman, 1910, etc., FNP, 1915, p. 60, pl. xxiii, fig. 5.

Twenty-three stations: 51, 53, 228, 230, 236; WS 76, 77, 79, 80, 83, 88, 89, 90, 92, 93, 95, 97, 98, 99, 109, 215, 217, 245.

Widely distributed and very often abundant in the finer material. The best series of specimens was obtained at WS 97, almost equally good at WS 76, 83, 92, 93 and 217.

388. **Pulvinulina patagonica** (d'Orbigny) (Plate XV, figs. 20–22).

Rotalina patagonica, d'Orbigny, 1839, FAM, p. 36, pl. ii, figs. 6–8.
Eponides patagonica, Cushman, 1927, FWCA, p. 162, pl. v, figs. 1, 2.

One station: WS 221.

A single specimen only. D'Orbigny records his species from the coast of Patagonia and from the sounding off Cape Horn, but does not refer to its presence in the Falkland Islands. His specific name has been used by Brady for a very different form (*vide Globorotalia scitula* (Brady), No. 375).

The Type tube in the Paris collection contains two specimens, which are in themselves evidence that the collection has been mishandled by some curator without much knowledge of the subject. One of them is *Rotalina* (*Pulvinulina*) *patagonica*, a very good specimen comparable with d'Orbigny's figure. The other is an equally good specimen of *Rosalina* (*Discorbina*) *peruviana*.

389. **Pulvinulina consobrina** (d'Orbigny).

Rosalina consobrina, d'Orbigny, 1839, FAM, p. 46, pl. vii, figs. 4–6.

One station: WS 83.

At this station a specimen was found which seems to be referable to d'Orbigny's *Rosalina consobrina*, originally described from the Peruvian coast. The specimens in the Type tube in Paris appear to be of varied origin and none agree very closely with d'Orbigny's figures. It is possible that other specimens have been overlooked owing to their general similarity to *P. karsteni*.

390. **Pulvinulina alvarezii** (d'Orbigny) (Plate XV, figs. 23–25).

Rotalina alvarezii, d'Orbigny, 1839, FAM, p. 35, pl. i, fig. 21; pl. ii, figs. 1, 2.

Two stations: WS 87, 89.

D'Orbigny's species was described from Patagonia and the Falkland Islands as "very rare". Our specimens are assigned with some hesitation to this species, as his figures are apparently conventionalized, especially that showing the inferior or oral surface. It seems probable that the species represents only a transition form between *P. karsteni* and *P. peruviana*. The Type so designated could not be found in Paris as such, but in a tube labelled "*Rotalina ungeriana* (Baden-Vienne)" are four shells, three of which are in good condition, and which agree quite well with d'Orbigny's figure, *ut supra*, and may perhaps be the missing Types.

391. **Pulvinulina karsteni** (Reuss) (Plate XV, figs. 26–36).

Rotalia karsteni, Reuss, 1855, KKM, p. 273, pl. ix, fig. 6.
Pulvinulina karsteni, Brady, 1864, RFS, p. 470, pl. xlviii, fig. 15; 1884, FC, p. 698, pl. cv, figs. 8, 9.
Pulvinulina karsteni, Heron-Allen and Earland, 1916, FWS, p. 276, pl. xlii, figs. 34–7.
Pulvinulina frigida, Cushman, 1922, FHB, p. 12.

Thirty-four stations: 48, 51, 53; WS 71, 73, 76, 77, 79, 80, 83, 86, 87, 88, 89, 90, 91, 92, 93, 95, 96, 97, 98, 108, 109, 210, 213, 215, 217, 219, 221, 225, 245, 246, 248.

Almost universally distributed and often very abundant. The best and most typical at WS 86, 87, 88, 210. The species is subject to great variation. Reuss's species was from the Chalk of Mecklenberg, and the recent specimens are generally more in agreement with the figures of Brady, which indicate an organism with a more flattened base. Cushman (*ut supra*) has suggested the separation of the recent forms under the name of *P. frigida*, but in view of the great range of variation which we have observed in the Falkland material, we have no hesitation in continuing to use Reuss's specific name to cover the group.

Reuss's original figure shows an almost equally biconvex test with seven chambers in the final convolution. This typical form occurs at nearly every station, but often in company with well marked variations. At WS 73, 97, 98, 109, 210, 217, either with or without the type, a form in which the superior face is only slightly curved, almost flat in some specimens, is found. The inferior or oral face has the normal convexity, which appears accentuated by contrast with the other face. At WS 79, 86, 219, the variation takes the form of a highly convex superior, and nearly flat inferior, or oral face. The number of chambers also occasionally varies. At WS 210, the specimens are very large, both typical and flat-topped varieties occur, and many have as many as nine chambers in a convolution. At WS 215 and 248, the same variation occurs, 8–9 chambers being found. This increase in the number of chambers is not in our opinion sufficient to modify the allocation of the specimens to *P. karsteni*, although it seems to indicate a form intermediate between *P. karsteni* and *P. peruviana*, in which latter species eleven chambers go normally to the convolution. Occasional specimens occur with limbate sutures on the superior face, a feature otherwise characteristic of *P. peruviana*.

392. **Pulvinulina peruviana** (d'Orbigny) (Plate XV, figs. 37–39).

Rotalina peruviana, d'Orbigny, 1839, FAM, p. 35, pl. ii, figs. 3–5.
Eponides peruviana, Cushman and Kellett, 1929, WCSA, p. 10, pl. iv, fig. 5.

One station: WS 73.

At this station which is in-shore to the north of the Falkland Islands, two specimens were found, which appear to be attributable to d'Orbigny's species, which was described originally from the coasts of Peru and Bolivia, and has recently been recorded, after the lapse of many years, from the west coast of South America, in its original locality (*ut supra*).

The difference between *P. peruviana* and *P. karsteni* lies in the greater convexity and fewer chambers of the latter species. In *P. peruviana*, there are eleven chambers *per* convolution, and the sutural lines are also slightly limbate on the superior face. It seems very possible that *P. peruviana* represents a Pacific, and *P. karsteni* an Atlantic form, and that the two species are very closely related.

Paris Types: there are two tubes both labelled "Amérique méridionale". The first contains two specimens, one of which is broken and unrecognizable, the other is a broken and dead shell, of which it can only be said that it may at one time have been recognizable as d'Orbigny's species. Now, the dorsal face is too decomposed to count the numbers of chambers on which identification would primarily rest; but it is certain that the specimen never had the limbate sutures of which d'Orbigny makes a point. The second tube contains five specimens, four of which are in good condition. They do not conform to d'Orbigny's description in so far as the sutures are concerned, these being nearly flush or even depressed, but they do generally agree with the form of the species, although none of them has more than ten chambers against the eleven shown in d'Orbigny's figure. There is no particular constancy in the specimens, and they show a considerable range in convexity.

Genus Rotalia, Lamarck, 1804

393. **Rotalia beccarii** (Linné).

Nautilus beccarii, Linné, 1767, SN (ed. XII), p. 1162, no. 276.
Rotalia beccarii, Brady, 1884, FC, p. 704, pl. cvii, figs. 2, 3.

One station: 228.

Only a single small but quite typical specimen at this station, which is between the Falkland Islands and the Burdwood Bank. The extraordinary absence of this cosmopolitan form from the area is quite inexplicable, especially as no other local species replaces it.

394. **Rotalia broeckiana**, Karrer.

Rotalia broeckiana, Karrer, 1878, FTTL, p. 98, pl. v, fig. 26.
Rotalia broeckiana, Brady, 1884, FC, p. 705, pl. cvii, fig. 4 *a–c*.

One station: WS 86.

A single rather small individual.

394 A. **Rotalia soldanii**, d'Orbigny.

Rotalia (Gyroidina) soldanii, d'Orbigny, 1826, TMC, p. 278, no. 5, Modèle no. 36.
Rotalia soldanii, Brady, 1884, FC, p. 706, pl. cvii, figs. 6 and 7.
Gyroidina soldanii, Cushman, 1918, etc., FAO, 1931, p. 38, pl. viii, figs. 3–8.

One station: WS 433.

A few pauperate specimens.

395. **Rotalia clathrata**, Brady (Plate XVI, figs. 1–4).

Rotalia clathrata, Brady, 1884, FC, p. 709, pl. cvii, figs, 8, 9.
Rotalia clathrata, Jones and Chapman, 1900, MCI, p. 232, pl. xx, fig. 2.
Rotalia clathrata, Heron-Allen and Earland, 1922, TN, p. 220.

Fourteen stations: 48, 388; WS 71, 83, 84, 86, 87, 88, 89, 90, 91, 92, 225, 245 (see also p. 309).

Moderately frequent at many stations, the best at WS 84, 86, 87, 88. At the latter, in particular, some exceptionally fine specimens were found, up to 1·0 mm. in diameter (fig. 1), quite indistinguishable from those of the New Zealand area. At WS 89 and 90, which are at the entrance to the Magellan Straits, the specimens are all very small and starved. The average size of specimens in the area is between 0·40 and 0·50 mm. in greatest diameter.

The occurrence of *R. clathrata* in the Falkland area is of extreme interest, as apparently representing the migration of a species from its original habitat. It will be noted that nearly all the stations are situated in the area to the south of the Falkland Islands, and between them and the entrance to the Pacific, and the best stations, WS 86, 87, 88, are at the entrance to the Falkland area. The species reaches its maximum development in the Australian and New Zealand seas. Brady also records its occurrence from the islands off the west coast of Patagonia, and figures specimens from that area to contrast them with those from New Zealand, which are larger and more strongly marked

and also more convex on the dorsal side. The general form and markings of the Falkland Islands specimens vary considerably, ranging from the very strong specimens already referred to at WS 88, to specimens even more depressed than Brady's Patagonian figure. In some instances the specimens are so flat that they might easily be taken, at a glance, for *Polystomella macella* (F. & M.). In the low elevation of the dorsal side, the specimens generally conform to the Patagonian type, but there are a sufficient number of intermediate and high-domed specimens to indicate that the height of the spire is not a feature of specific value.

Sub-family *TINOPORINAE*

Genus **Gypsina**, Carter, 1877

396. **Gypsina inhaerens** (Schultze).

Acervulina inhaerens, Schultze, 1854, OP, p. 68, pl. vi, fig. 12.
Gypsina inhaerens, Brady, 1884, FC, p. 718, pl. cii, figs. 1–6.
Gypsina inhaerens, Goës, 1894, ASF, p. 91, pl. xv, fig. 787.

Three stations: 388; WS 84, 88.

Common on shell fragments and stones, the best at 388 and WS 88. The specimens grow, usually, in a more or less heaped-up, but at the same time depressed cone, and are extremely difficult to separate from the few larger specimens which are suspected of being a primitive form of *Polytrema* q.v.

397. Genus **Polytrema**, Risso, 1826.

At 388, WS 225 and 246, a few specimens of an organism of suggestive appearance, attached to shell fragments and Polyzoa, conveyed an impression that it might be *Polytrema*. The fragments were sent to Dr S. H. Hickson, F.R.S., who expressed the opinion that he could determine with sufficient certainty the presence of the "pillar pores" characteristic of that genus to assign them thereto. They will not be referable to the species *P. miniaceum*, but they may represent a much more primitive and hitherto undescribed species in the genus. The Falkland area is far removed from any hitherto recorded locality for the genus, and the matter must remain in abeyance pending the arrival of more material.

Family NUMMULINIDAE

Sub-family *POLYSTOMELLINAE*

Genus **Nonion**, Montfort, 1808

398. **Nonion incrassatum** (Fichtel and Moll) (Plate XVI, figs. 5, 6).

Nautilus incrassatus, Fichtel and Moll, 1798, TM, p. 38, pl. iv, figs. *a–c*.
Nonionina incrassata, Terrigi, 1883, CQ, p. 205, pl. iv, fig. 52.
Nonionina incrassata, Gümbel, 1885, GB, 1, pt ii, p. 421, composite fig. 266 (24).

Two stations: 48; WS 215.

A single specimen at 48 and two very fine specimens at WS 215 appear to be nearer to Fichtel and Moll's figure than to any other with which we are acquainted. They are

characterized by the large number of chambers (14–16) visible in the final convolution, and a thick rounded edge, but they have a rather sunken umbilicus marked by granulations instead of the umbilical boss indicated by Fichtel and Moll. The chambers are inflated and the sutures depressed. When the shell is glassy, the light on the highest points of the chambers gives a false impresion of stellate limbation to the test.

Very similar specimens occur in British material, and have usually been recorded as *N. asterizans*. The Falkland specimens of *N. asterizans*, however, present so many differences that we have thought it desirable to separate them. Fichtel and Moll's name has been little used, but is the geno-holotype of *Nonion*.

399. **Nonion depressulum** (Walker and Jacob).

Nautilus depressulus, Walker and Jacob, 1798, AEM, p. 641, pl. xiv, fig. 33.
Nonionina depressula, Brady, 1884, FC, p. 725, pl. cix, figs. 6, 7.
Nonionina depressula, Chapman, 1914, FORS, p. 70, pl. v, fig. 41.

Fourteen stations: 48, 51, 228, 235, 388; WS 88, 90, 92, 221, 245, 248, 408, 409, 433.

The specimens are often numerous but never very large, nor are they particularly typical. They are generally small and pauperate, the best being at WS 88. Very good also at WS 408, but here they are small though typical. There is as usual considerable variation, especially in the direction of *N. stelligera*, many of the specimens, especially at WS 92, showing limbate markings at the umbilicus.

400. **Nonion asterizans** (Fichtel and Moll).

Nautilus asterizans, Fichtel and Moll, 1798, TM, p. 37, pl. iii, figs. *e–h*.
Polystomella crispa var. (*Nonionina*) *asterizans*, Parker and Jones, 1865, NAAF, p. 403, pl. xiv, fig. 35; pl. xvii, fig. 54.
Nonionina asterizans, Heron-Allen and Earland, 1913, CI, p. 143, pl. xiii, figs. 12, 13.

Six stations: 51; WS 83, 88, 90, 93, 408.

Never very common and, as with all the genus, the specimens are as a rule small. Good and typical specimens at WS 88 and 93.

401. **Nonion umbilicatulum** (Walker and Jacob).

Nautilus umbilicatulus, Walker and Jacob, 1798, AEM, p. 641, pl. xiv, fig. 34.
Nautilus umbilicatulus, Montagu, 1803–8, TB, p. 191; Suppl. p. 78, pl. xviii, fig. 1.
Nonionina barleeana, Williamson, 1858, RFGB, p. 32, figs. 68, 69.
Nonionina umbilicatula, Terrigi, 1883, CQ, p. 203, pl. iv, fig. 48.
Nonion barleeanum, Cushman, 1918, etc., FAO, 1930, p. 11, pl. iv, fig. 5.

Nine stations: 236; WS 88, 91, 99, 215, 221, 248, 408, 409.

Rare: all the specimens are very small. The figures of Walker and Jacob, and of Montagu are more or less unrecognizable, but the specific name has become definitely associated with a species very common in northern waters. This species was first admirably illustrated by Williamson (*ut supra*).

402. **Nonion pompilioides** (Fichtel and Moll).

Nautilus pompilioides, Fichtel and Moll, 1798, TM, p. 31, pl. ii, figs. *a–c*.
Nonionina pompilioides, Brady, 1884, FC, p. 719, pl. cix, figs. 10, 11.
Nonionina pompilioides, Cushman, 1910, etc., FNP, 1914, p. 25, pl. xvii, fig. 2.

One station: WS 86.

A single small but typical specimen.

403. **Nonion sloanii** (d'Orbigny) (Plate XVI, figs. 7, 8).

Nonionina sloanii, d'Orbigny, 1839, FC, p. 46, pl. vi, figs. 18 and 18 *bis*.
Nonion sloanii, Cushman, 1918, etc., FAO, 1930, p. 9, pl. iii, figs. 6–8.

Four stations: WS 80, 83, 99, 225.

This is not a very satisfactory species. It appears to be merely a form of *N. grateloupi* characterized by greater turgidity and fewer chambers. It is possibly intermediate between *N. grateloupi* and *N. scapha*. Specimens referable to it are infrequent, but a good series was obtained at WS 83 and 225. It is nowhere common. The Type specimen in Paris is much encrusted, but is recognizable, the sutures being comparatively shallow.

404. **Nonion stelligerum** (d'Orbigny).

Nonionina stelligera, d'Orbigny, 1839, FIC, p. 128, pl. iii, figs. 1, 2.
Nonionina stelligera, Brady, 1884, FC, p. 728, pl. cix, figs. 3–5.
Nonionina stelligera, Heron-Allen and Earland, 1916, FWS, p. 280, pl. xliii, figs. 8–10.

Seventeen stations: 48, 51, 53, 236, 388; WS 83, 86, 88, 89, 90, 91, 92, 93, 217, 221, 245, 408.

This is probably the most abundant and characteristic species of the genus, often fairly numerous and better developed and larger than most of the other species. The local type is characterized by six chambers, and appears to be present in two distinct forms which probably represent the megalo- and microspheric stages. The larger form is characterized by chambers rapidly increasing in the degree of inflation, so that the final chamber is very often very greatly swollen. In the smaller form, the shell is compressed throughout its growth. The finest series was found at WS 88, where both forms were observed. The larger form was noted at 48 and WS 93 and 245, the smaller form at WS 89, 90 and 92. The Type is missing in Paris.

405. **Nonion boueanum** (d'Orbigny).

Nonionina boueana, d'Orbigny, 1846, FFV, p. 108, pl. v, figs. 11, 12.
Nonionina boueana, Terrigi, 1889, CP, p. 119, pl. x, fig. 5.
Nonionina boueana, Fornasini, 1900, FA, p. 400, fig. 49.

Two stations: WS 92, 245.

Excellent specimens at WS 245, identical with the Paris Type, less typical at the other stations.

406. **Nonion grateloupi** (d'Orbigny) (Plate XVI, figs. 9, 10).

Nonionina grateloupi, d'Orbigny, 1826, TMC, p. 294, no. 19; 1839, FC, p. 46, pl. vi, figs. 6, 7.
Nonionina grateloupi, Fornasini, 1904, SOF, p. 12, pl. iii, fig. 5.

Seven stations: 235; WS 76, 83, 88, 89, 93, 99.

This species, so common in the warmer waters of the West Indian region, is comparatively rare in the Falkland area, and at most of the stations the specimens are very small and pauperate. Very good and typical specimens were obtained however at WS 83, 88 and 93, particularly at the latter station. The Type is missing.

407. **Nonion scapha** (Fichtel and Moll).

Nautilus scapha, Fichtel and Moll, 1798, TM, p. 105, pl. xix, figs. *d–f*.
Nonionina scapha, Brady, 1865, RFND, p. 106, pl. xii, fig. 10; 1884, FC, p. 780, pl. cix, figs. 14, 15.

Sixteen stations: 228, 230, 235; WS 76, 83, 99, 210, 215, 217, 221, 225, 245, 248, 408, 409, 433.

Widely distributed and often fairly common. Excellent specimens at WS 83, 99, 215, 217, 221 and 245; WS 217, in particular, furnishing a striking series. There is, as usual, great variation both in the length and thickness of the test at the oral face, even in specimens from the same station. At some stations, particularly 228 and WS 76, 408, specimens approaching *N. labradorica* (J. W. Dawson) (D. 1860, TFL, p. 191, fig. 4; D. 1870, GStL, p. 174, fig. 5) (G. M. Dawson, *N. scapha* var. *labradorica*) occur.

408. **Nonion pauperatum** (Balkwill and Wright).

Nonionina pauperata, Balkwill and Wright, 1885, DIS, p. 353, pl. xiii, figs. 25, 26.
Nonionina pauperata, Heron-Allen and Earland, 1908, etc., SB, 1911, p. 342, pl. xi, figs. 16, 17.
Nonion pauperatum, Cushman, 1918, etc., FAO, 1930, p. 13, pl. v, figs. 4, 5, 7.

Seven stations: 51, 388; WS 88, 89, 90, 92, 245.

Never very common, but quite typical. An excellent series at WS 88. The specimens are absolutely indistinguishable from those found in its locality of origin, the British Isles. It is clearly a very widely distributed species, although the records are so few.

Genus Nonionella, Cushman, 1926

Whilst this paper was in course of preparation we had occasion to publish the following paragraph (H.-A. & E. 1930, FPD, p. 193): "The genus *Nonionella* was instituted by Cushman in 1926 (C. 1925, etc., LFR, II, 1926, p. 64) supplementing *Nonionina*. It includes those species having inaequilateral tests due to the chambers developing lobed extensions on the ventral side at their umbilical ends, which cover the umbilicus itself. It is questionable whether the genus has biological significance, because the formation of inaequilateral tests is a common feature of variation in many species of *Nonionina*, but for systematic purposes *Nonionella* is useful for the separation of species which are normally asymmetrical". The much extended experience derived from the examination of the Discovery material has amply confirmed our views.

409. **Nonionella auris** (d'Orbigny) (Plate XVI, figs. 17–19).

Valvulina auris, d'Orbigny, 1839, FAM, p. 47, pl. ii, figs. 15–17.
Nonionella auris, Cushman and Kellett, 1929, WCSA, p. 5, pl. i, fig. 9; pl. ii, figs. 2, 3.

Seven stations: 228; WS 76, 83, 86, 210, 215, 225.

Never frequent, indeed generally rare, but a good many specimens have been obtained. Most numerous at WS 83, where it was found of all sizes. The best specimens at WS 215, 225; at 228 and WS 210 all the specimens were very small. Large specimens measured 0·50 mm. in breadth, 0·40 mm. in width and 0·30 mm. in thickness at the oral face.

D'Orbigny's species is a typical Pacific form. He does not record it at all from the Falkland Islands, but only from the Chilean and Peruvian coasts "between 34° S and the equator", and he records it as very common, in fact at Payta the species "formed $\frac{9}{10}$ths of the material gathered". There are two Type tubes in Paris. One marked "Chile and Peru" contained no specimens of *N. auris*, but varieties of *N. scapha* and *N. boueana*. The second tube labelled "Amérique méridionale" contains specimens identical with those which we figure.

410. **Nonionella iridea**, sp.n. (Plate XVI, figs. 14–16).

Six stations: 236; WS 93, 217, 221, 248, 433.

Test minute, hyaline, consisting of about 12–14 chambers, arranged inaequilaterally in an evolute spiral. Six or seven of the chambers are exposed on one side of the test, the whole of the series more or less visible on the other. The primordial chamber often appears as a central boss. Sutures depressed, and chambers more or less inflated. Peripheral edge broad, slightly lobulate. Colour glassy to white, often iridescent owing to diffraction spectra caused by the thinness of the shell.

In appearance this little shell bears considerable resemblance to *Nonionella auris* (d'Orbigny), though differing in the number of chambers and size. It was at first thought that it might have some connection with the life-history of that species, but this theory was abandoned when its distribution was found to be quite different. Zoologically, we think that it is probably no more than a starved and pauperate form of *N. scapha* (Fichtel and Moll) which has assumed the inaequilateral (*Nonionella*) mode of growth perhaps as a result of unfavourable conditions of existence. It is much more abundant in the South Georgia area, where it is frequently one of the dominant species, than in the Falklands; its limited distribution in the latter area may perhaps indicate that it is an introduced form which has not yet succeeded in establishing itself widely.

There is a considerable amount of variation in the degree of inflation of the chambers, and this, in its turn, affects the general appearance of the shell.

Breadth averages 0·20 mm.; width, 0·15 mm.; thickness at oral face, 0·11 mm.

411. **Nonionella chiliensis**, Cushman and Kellett (Plate XVI, figs. 11–13).

Nonionella chiliensis, Cushman and Kellett, 1929, WCSA, p. 6, pl. ii, figs. 4 *a–c*.

One station: WS 91.

At this station, which is just on the edge of the Continental Shelf between the Falkland Islands and the Straits of Magellan, a single specimen was found which appears to agree with the figure and description of *N. chiliensis*, recently described from the Chilean coast. The specimen is a dead and worn shell and may have drifted a long way. The specimen measures 0·65 mm. in breadth, and 0·55 mm. in width.

The authors remark that "at first glance this might not be thought to be a *Nonionella*". With this we agree, but in the absence of further material are not prepared to question the assignment.

Genus Elphidium, Montfort, 1808

412. Elphidium (Polystomella) incertum (Williamson) (Plate XVI, figs. 20, 21).

Polystomella umbilicatula var. *incerta*, Williamson, 1858, RFGB, p. 44, fig. 82 *a*.
Polystomella decipiens, Heron-Allen and Earland (*non* Costa), 1916, FWS, p. 282, pl. xliii, figs. 20–22.
Elphidium incertum, Cushman, 1918, etc., FAO, 1930, p. 18, pl. vii, figs. 4–9.

Four stations: 51; WS 86, 89, 90.

Williamson's variety (*P. umbilicatula* var. *incerta*) which, in the absence of any specimens of the typical *P. striato-punctata* (Fichtell and Moll), may claim the earliest name for the cooler water types so generally assigned to Fichtel and Moll's species, is by no means common in this material compared with its abundance in northern waters, but excellent specimens in considerable numbers occur at WS 89 and 90.

413. Elphidium (Polystomella) excavatum (Terquem) (Plate XVI, figs. 22, 23).

Polystomella umbilicatula, Williamson (*non* W. & J.), 1858, RFGB, p. 42, fig. 81.
Polystomella excavata, Terquem, 1875, etc., APD, 1875, p. 25, pl. ii, fig. 2.
Elphidium excavatum, Cushman, 1918, etc., FAO, 1930, p. 21, pl. viii, figs. 1–7.

Two stations: WS 89, 92.

Under this name Terquem separated the very common northern type which Williamson had earlier figured admirably under the erroneous designation *P. umbilicatula*, Walker (and Boys). The specimens are curiously rare in the Falkland Islands material, probably owing to the water being of too high a salinity. On the British Coasts, the species reaches its maximum development in numbers and size under estuarine conditions.

414. Elphidium (Polystomella) articulatum (d'Orbigny).

Polystomella articulata, d'Orbigny, 1839, FAM, p. 30, pl. iii, figs. 9, 10.
Elphidium articulatum, Cushman, 1918, etc., FAO, 1930, p. 26, pl. x, figs. 6–8.

Three stations: 51, 235; WS 217.

This species, recorded by d'Orbigny from the Falkland Islands, is rare in our material, probably on account of the too great depth, as Cushman reports it as being common in the shallow water gatherings made by Dr Waldo Schmitt in the same area. The Type in Paris appears to have been transposed. The tube labelled *P. articulata* contains only a single specimen covered with efflorescence; when this was removed by careful washing,

it disclosed a sharp-edged form with twelve slightly inflated chambers; the sutures and fossettes are deeply stained with iron, the rest of the shell white. It is clearly *not* the Type of *P. articulata*, but is possibly a fossil from the Vienna beds, suggesting *P. flexuosa* (d'O. 1846, FFV, p. 127, pl. vi, figs. 15, 16) although the chambers are not so numerous as in d'Orbigny's figure.

415. **Elphidium (Polystomella) alvarezianum** (d'Orbigny) (Plate XVI, figs. 24, 25).

Polystomella alvareziana, d'Orbigny, 1839, FAM, p. 31, pl. iii, figs. 11, 12.
Elphidium alvarezianum, Cushman, 1918, etc., FAO, 1930, p. 18, pl. vii, figs. 1–3.

Eight stations: 48, 51; WS 83, 86, 92, 99, 215, 408.

D'Orbigny recorded his species from the coast of Patagonia and the Falkland Islands. It is a fairly distinctive form, and is probably widely distributed in shallower waters than that from which most of the Discovery material emanated. But it is fairly abundant, and excellent specimens occur at several stations, notably 48 and WS 86. D'Orbigny records the colour as being "bluish white", presumably this merely refers to a hyaline condition. The majority of specimens present this appearance.

Breadth, about 0·65 mm.; width, 0·55 mm.; thickness at oral face, 0·25 mm.

The Type specimen is not to be found in Paris.

416. **Elphidium (Polystomella) magellanicum**, sp.n. (Plate XVI, figs. 26–28).

Two stations: WS 89, 90.

Test free, hyaline, compressed, exhibiting five to six chambers in the outer convolution. Sutures strongly depressed, chambers slightly inflated, giving a markedly lobulate peripheral edge. The sutural depressions are filled with very finely granular matter, giving a somewhat snow-like surface, contrasting strongly with the inflated glassy chambers, which are generally quite transparent. Underneath the granular snow-like matter in the sutures, the "fossettes" are concealed, but in young specimens they are plainly visible.

Dimensions, breadth, up to 0·35 mm.; width, 0·30 mm.; thickness at oral face, 0·12 mm.

The species occurs only at WS 89 and 90, which are in shallow water (23 and 82 m.) on the opposite (north and south) sides of the eastern entrance to the Straits of Magellan. In some respects they resemble the specimens figured by us from the West of Scotland (H.-A. & E. 1916, FWS, p. 281, pl. xliii, figs. 11–19) as *P. faba*, Fichtel and Moll, but they are more compressed and more lobulate, and the "fossettes" are much more distinct.

417. **Elphidium (Polystomella) lessonii** (d'Orbigny) (Plate XVI, figs. 29, 30).

Polystomella lessonii, d'Orbigny, 1826, TMC, p. 284, no. 6; 1839, FAM, p. 29, pl. iii, figs. 1, 2.
Polystomella macella, Brady, 1884, FC, pl. cx, fig. 9.
Polystomella lessonii, Fornasini, 1904, SOF, p. 13, pl. iii, fig. 9.
Elphidium lessonii, Cushman, 1918, etc., FAO, 1930, p. 22, pl. ix, figs. 1–4.

Fourteen stations: 48, 51; WS 71, 73, 76, 83, 86, 88, 93, 97, 210, 225, 246, 248.

Widely distributed, and often large and common. The best at WS 86, excellent specimens also at 48 and WS 83, 248. The Type was not to be found in Paris.

P. lessonii is usually regarded as a synonym of *P. macella*, but it is fairly distinctive, and is certainly a very localized form. It cannot be confused with the *P. macella* of European seas. D'Orbigny's records are from the coast of Patagonia and the Falkland Islands, and the species is apparently confined to this area.

418. **Elphidium (Polystomella) macellum** (Fichtel and Moll).

Nautilus macellus (var. *a*), Fichtel and Moll, 1798, TM, p. 66, pl. x, figs. *e–g*.
Polystomella macella, Brady, 1884, FC, p. 737, pl. cx, figs. 8, 11 (only).
Elphidium macellum, Cushman, 1925, etc., LFR, v, 1929, p. 18, pl. iv, figs. 1, 2.

Six stations: 53; WS 84, 88, 91, 93, 215.

Very rare, but excellent specimens, in no way distinguishable from the *P. macella* of European waters, were obtained at 53 and almost equally good at WS 88. At WS 93, a young specimen with a minutely spinous periphery occurred. *P. macella* may be distinguished from *P. lessonii* by the sharp peripheral edge. Both species are compressed, but in *P. lessonii* the periphery is rounded.

419. **Elphidium (Polystomella) owenianum** (d'Orbigny) (Plate XVI, figs. 31, 32).

Polystomella oweniana, d'Orbigny, 1839, FAM, p. 30, pl. iii, figs. 3, 4.
Elphidium owenianum, Cushman, 1918, etc., FAO, 1930, p. 21, pl. viii, figs. 10–12.

Fifteen stations: 48; WS 71, 72, 83, 84, 86, 87, 88, 90, 91, 93, 95, 210, 225, 248.

Widely distributed and often very common, the best at WS 71, 86, 88, 91 and 93, particularly WS 71.

We record our specimens under this name merely in deference to the fact that d'Orbigny recorded his species from the adjacent coast of Patagonia, where he describes it as "rare". He does not mention its occurrence in the Falkland Islands. *P. oweniana* has usually been regarded as a synonym of *P. crispa* and, as a matter of fact, at least 75 per cent of the Falkland specimens would pass without hesitation for the British form, which since 1848 at least has been universally known as *P. crispa*. The most recent school of taxonomy inclines to the separation under separate specific names of what the old school regarded merely as local varieties, and hence in the recently published monograph of the Atlantic Foraminifera (Cushman, FAO, 1918 etc., 1930) we find that *P. crispa* hardly figures at all, the author preferring to reserve his opinion of the identity of the numerous records of that species for a more intensive study of the genus. For ourselves, we take the view that *P. crispa* (or *Elphidium crispum*) (Linn.) is a polymorphic species, and we should prefer to retain this long established name, whether dealing with the larger Mediterranean form with the clear prominent and central umbo such as, no doubt, Plancus had before him when he drew the miserable figure upon which the species is based (*De conchis minus notis*, Venice, 1739, p. 10, pl. i, fig. 2), or whether dealing with the more flattened form which Williamson figured so admirably in 1858 (W. 1858, RFGB, p. 40, pl. iii, figs. 78, 79), and upon which so many hundreds

of records must have been established. We regard them merely as the local types of one species of almost world-wide distribution. Between these two extremes almost every conceivable variation can be found, and no scientific purpose appears to be served by the multiplication and resuscitation of useless specific names.

The Falkland specimens present considerable variation in the thickness of the shell. D'Orbigny separated his species from *P. lessonii* "par son centre ombilical convexe au lieu d'être concave", but, as a matter of fact, the Falkland specimens show great range of variation. In some the umbilicus is highly convex and clear, and except for the smaller size of the specimens, are of the Mediterranean type; in the others the shell is almost flattened on both sides, and at WS 86 the flattening goes to the extent of a depressed umbilicus. Between these extremes every possible variation is to be found.

The Paris Type tube contained five specimens; one of them is entirely destroyed by efflorescence, and one is *P. alvareziana*, a very good specimen from which the figure of that species might have been drawn. Of the other three, one is identical with d'Orbigny's figure, the other two represent transitional stages towards the formation of the central umbo which distinguishes *P. crispa*.

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The number of authorities referred to in the synonymies of the 435 species described in this Monograph is so great that it has been necessary to make every effort to economise space. The principle, therefore, first adopted by us in the Clare Island Monograph, has been followed here.

Names of authors, titles of articles, and full bibliographical references to the Transactions and Proceedings in which they are to be found are given in this Bibliography, some lengthy titles being shortened, as follows:

AMNH. = Annals and Magazine of Natural History, London.
JRMS. = Journal of the Royal Microscopical Society, London.
JQMC. = Journal of the Quekett Microscopical Club, London.
MASIB. = Memorie della Reale Accademia delle Scienze dell' Istituto di Bologna.
QJGS. = Quarterly Journal of the Geological Society, London.
SAWW. = Sitzungsberichte der Kaiserliche Akademie der Wissenschaften Wien. (D = Denkschrift.)

The titles of papers and books are indicated by initials only, after the date of publication, and the first letter of the author's name: thus, A. 1865, NHC. = T. Alcock, *Notes on Natural History Specimens*, etc., the page, etc., only being given, and all further details being found under that initial and date in the Bibliography. In the case of long or short series of papers, the date of the first is given and the initials are followed by the year in which the paper referred to appeared: thus, M. 1898, etc. FM, 1900 = the papers of Millett's series beginning in 1898, which were published in JRMS. in 1900.

Brady, when quoting d'Orbigny's Cuba Monograph of 1839, nearly always gave the page in the Spanish edition of 1840. We have invariably given the pagination of the original French edition of 1839. When plates have two numbers, as in some of the Memoirs of the Société Géologique de France, both numbers are given, e.g., T. 1878, FIR, pl. ix (xiv).

Again, much confusion has crept into synonymies by reason of the re-pagination of reprints, a practice which reaches its worst development and results in Parker and Jones' "Nomenclature of the Foraminifera" (P. & J., etc., 1859, etc., NF.) and in Schlumberger's consecutively re-paginated series of reprints. We have endeavoured in every case to give the original page of the journal in which the papers were published.

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[This was reprinted with very slight alterations and additions in the official volume *Deuxième Expédition Antarctique Française* (1908–10), *Foraminifères, par E. Fauré-Fremiet* (Paris, 1914), 16 pp., 1 pl. The text-figures are redrawn and better reproduced by photo-lithography on the plate.]

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INDEX

IN the following Index the aim of the compiler has been to combine brevity with all practical utility. Specific names indexed as such have not been repeated under the generic headings. When a specific name is known to the enquirer, the generic name, or names, to which it has been attached follow it in the Index. When it is desired to note all the species representing a particular genus, the specific names will be found between the numbers indicated after the name of the genus in the Index. When a generic name is followed by a specific name in the Index, it indicates that the species has been transferred to another genus and appears as a synonym. The whole of certain "groups" of synonyms fall within the limits of certain genera of more modern authors, e.g. *Quinqueloculina* in *Miliolina*, *Oolina* in *Lagena*, *Guttulina* in *Polymorphina* and so on; in such cases all the species falling under such synonyms are indicated (by numbers) together, under the superseded generic name.

The letter S in front of a number indicates that the name is a synonym; the letter T so placed indicates that the species is referred to in the text under the number which it precedes.

PLATES VI—XVII

PLATE VI

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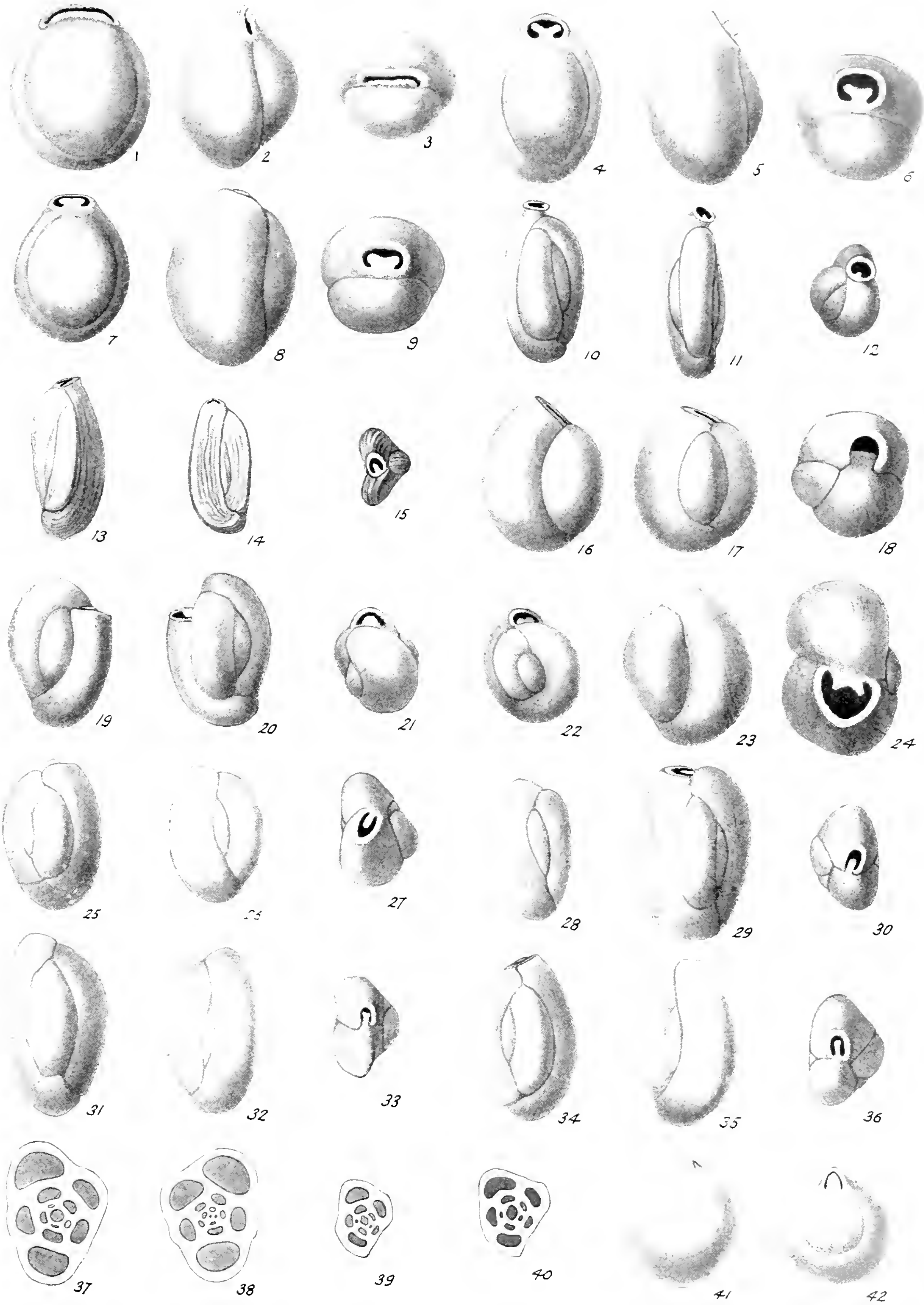

PLATE VII

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PLATE VII

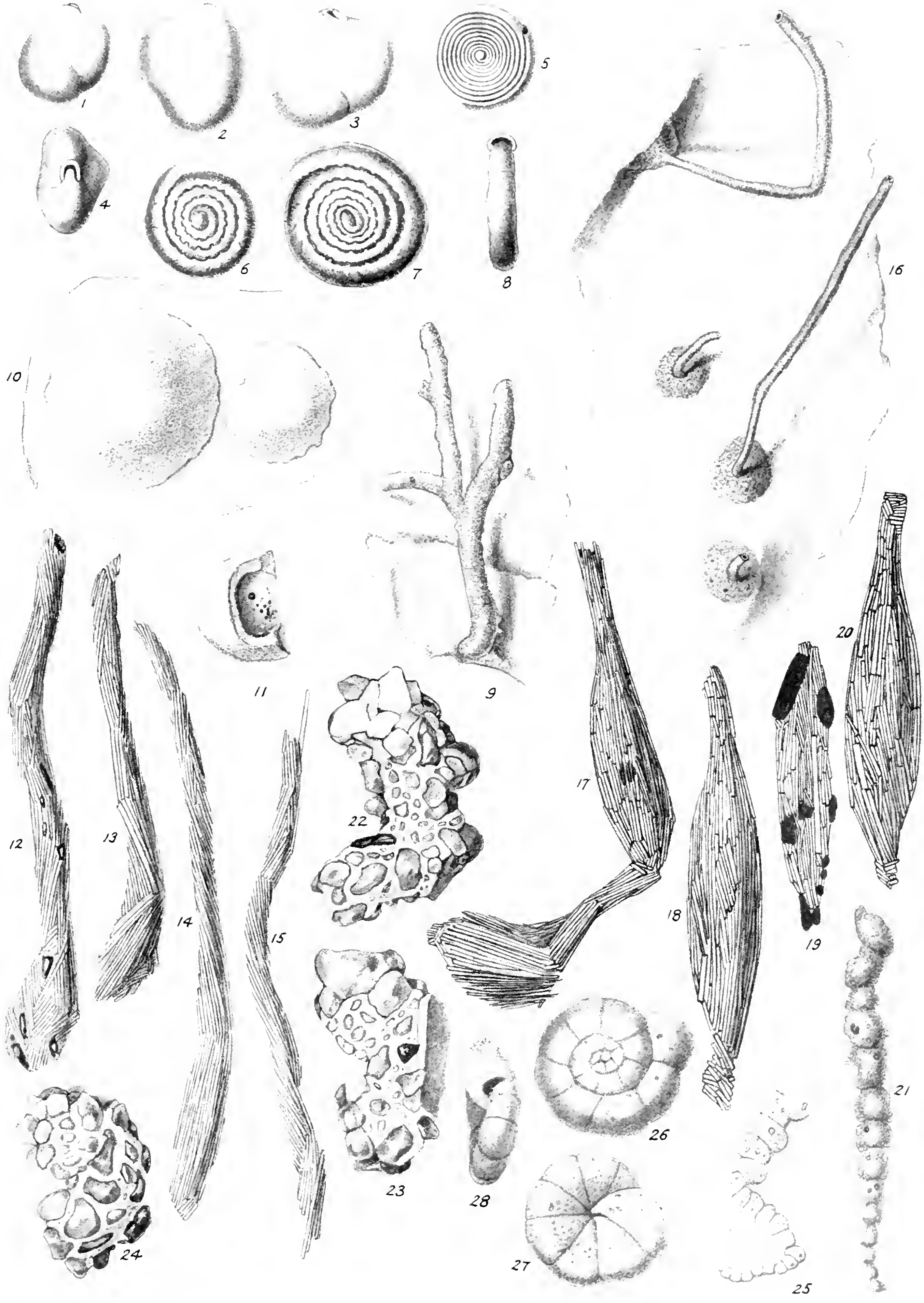

PLATE VIII

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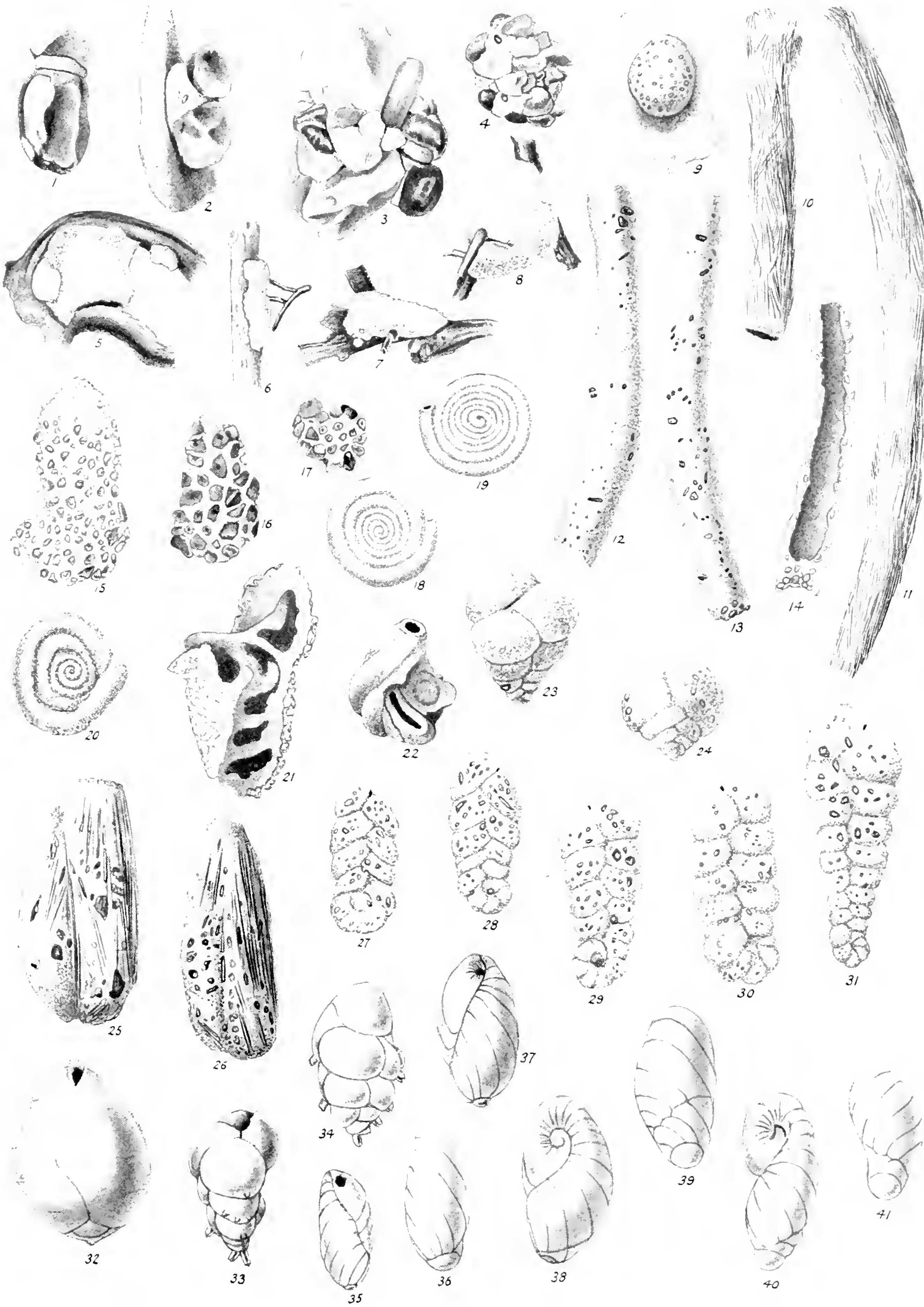
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PLATE IX

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PLATE X

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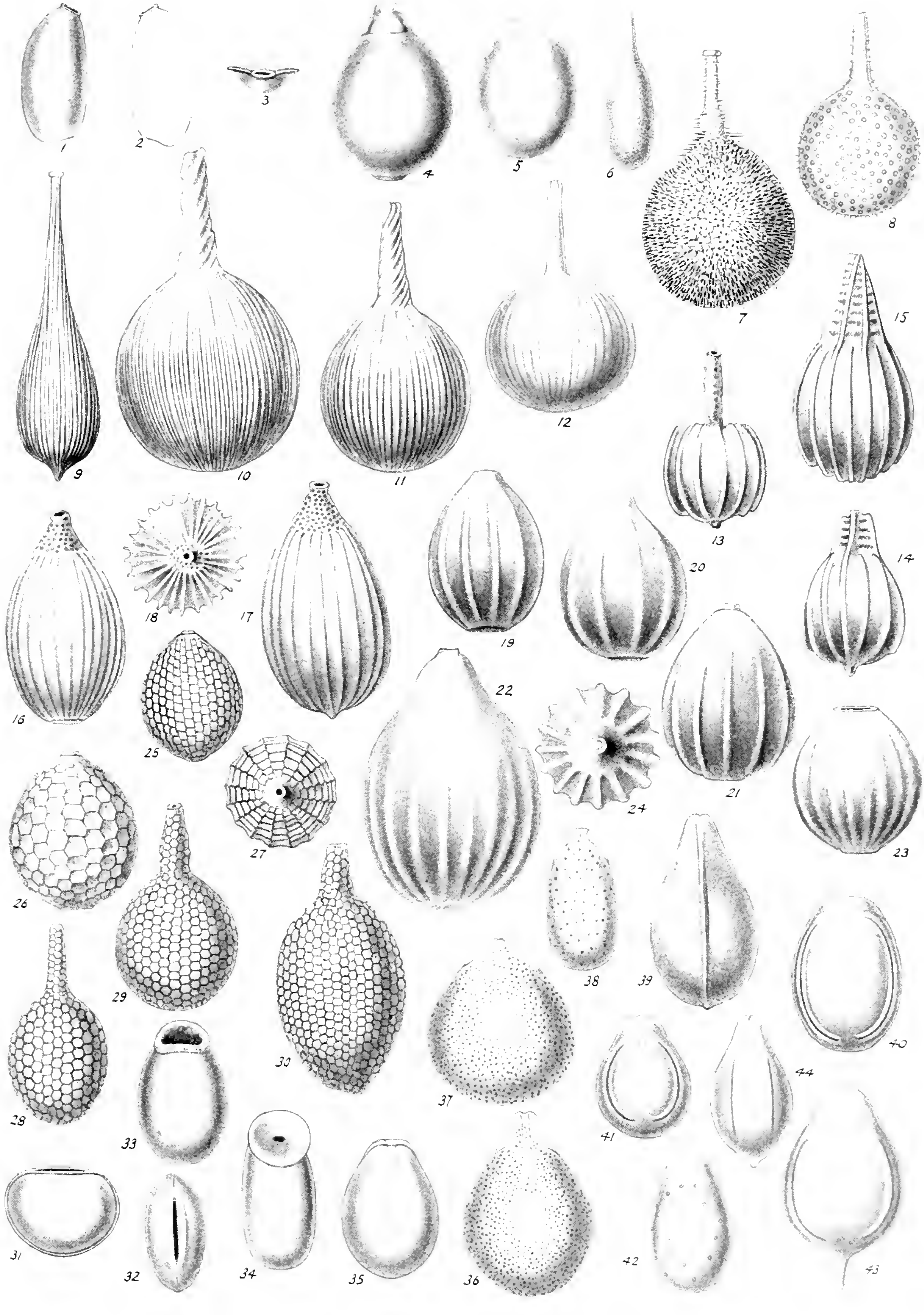
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PLATE XI

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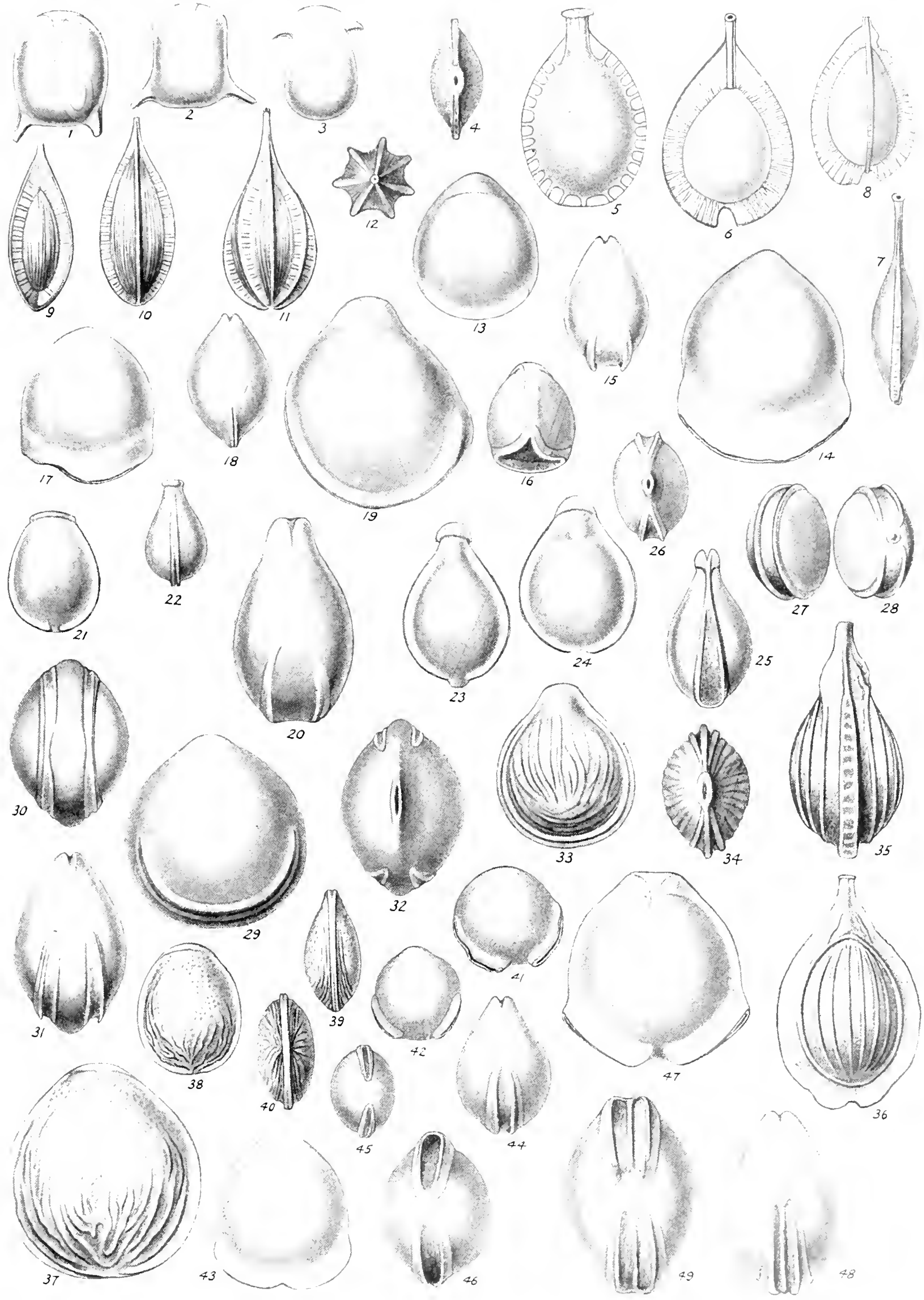
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PLATE XII

Fig. 1. *Nodosaria rotundata* (Reuss) (No. 247). Spinous variety: × 34.
Fig. 2. *Nodosaria laevigata*, d'Orbigny (No. 248). Spinous variety: × 34.
Figs. 3, 4. *Nodosaria pellita*, Heron-Allen and Earland (No. 258). × 110.
Fig. 5. *Nodosaria lepidula*, Schwager (No. 259). × 164.
Figs. 6, 7. *Lingulina falcata*, sp.n. (No. 262). Side views: × 164.
Fig. 8. *Lingulina falcata*, sp.n. (No. 262). Abnormal: × 164.
Figs. 9, 10. *Lingulina translucida*, nom.nov. (No. 263). Side views: × 124.
Fig. 11. *Lingulina translucida*, nom.nov. (No. 263). Edge view: × 124.
Fig. 12. *Lingulina vitrea*, sp.n. (No. 264). Microspheric; side view: × 124. The double sutural lines are due to the transparency of the test.
Fig. 13. *Lingulina vitrea*, sp.n. (No. 264). Megalospheric; side view: × 124.
Fig. 14. *Lingulina vitrea*, sp.n. (No. 264). Microspheric; edge view: × 124. The thickness is exaggerated in the drawing.
Fig. 15. *Cristellaria crepidula* (Fichtel and Moll) (No. 268). Microspheric pair in conjugation: × 164.
Figs. 16–18. *Cristellaria tenuissima*, sp.n. (No. 269). Microspheric; side views: × 124.
Fig. 19. *Cristellaria tenuissima*, sp.n. (No. 269). Microspheric; edge-oral view: × 124.
Fig. 20. *Cristellaria tenuissima*, sp.n. (No. 269). Megalospheric; side view: × 124.
Fig. 21. *Cristellaria rotulata* (Lamarck) (No. 276). Abnormal specimen: × 64.
Fig. 22. *Cristellaria angulata*, Reuss (No. 282). Side view: × 110.
Fig. 23. *Cristellaria angulata*, Reuss (No. 282). Edge-oral view: × 110.
Figs. 24, 25. *Polymorphina plancii* (d'Orbigny) (No. 284). Side views: × 110.
Fig. 26. *Polymorphina williamsoni*, Terquem (No. 285). Microspheric; side view: × 110.
Fig. 27. *Polymorphina williamsoni*, Terquem (No. 285). Megalospheric; side view: × 110.
Fig. 28. *Polymorphina williamsoni*, Terquem (No. 285). Microspheric specimen with accessory chamber: × 110.
Fig. 29. *Uvigerina bifurcata*, d'Orbigny (No. 298). × 64.
Fig. 30. *Uvigerina raricosta*, d'Orbigny (No. 299). × 110.
Fig. 31. *Uvigerina striata*, d'Orbigny (No. 300). × 74.
Figs. 32–37. *Uvigerina angulosa*, Williamson (No. 301). × 74.
Figs. 38, 39. *Uvigerina angulosa*, Williamson (No. 301). Abnormal specimens: × 74.
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Fig. 44. *Siphogenerina dimorpha* (Parker and Jones) (No. 303). Abnormally long individual: × 74.

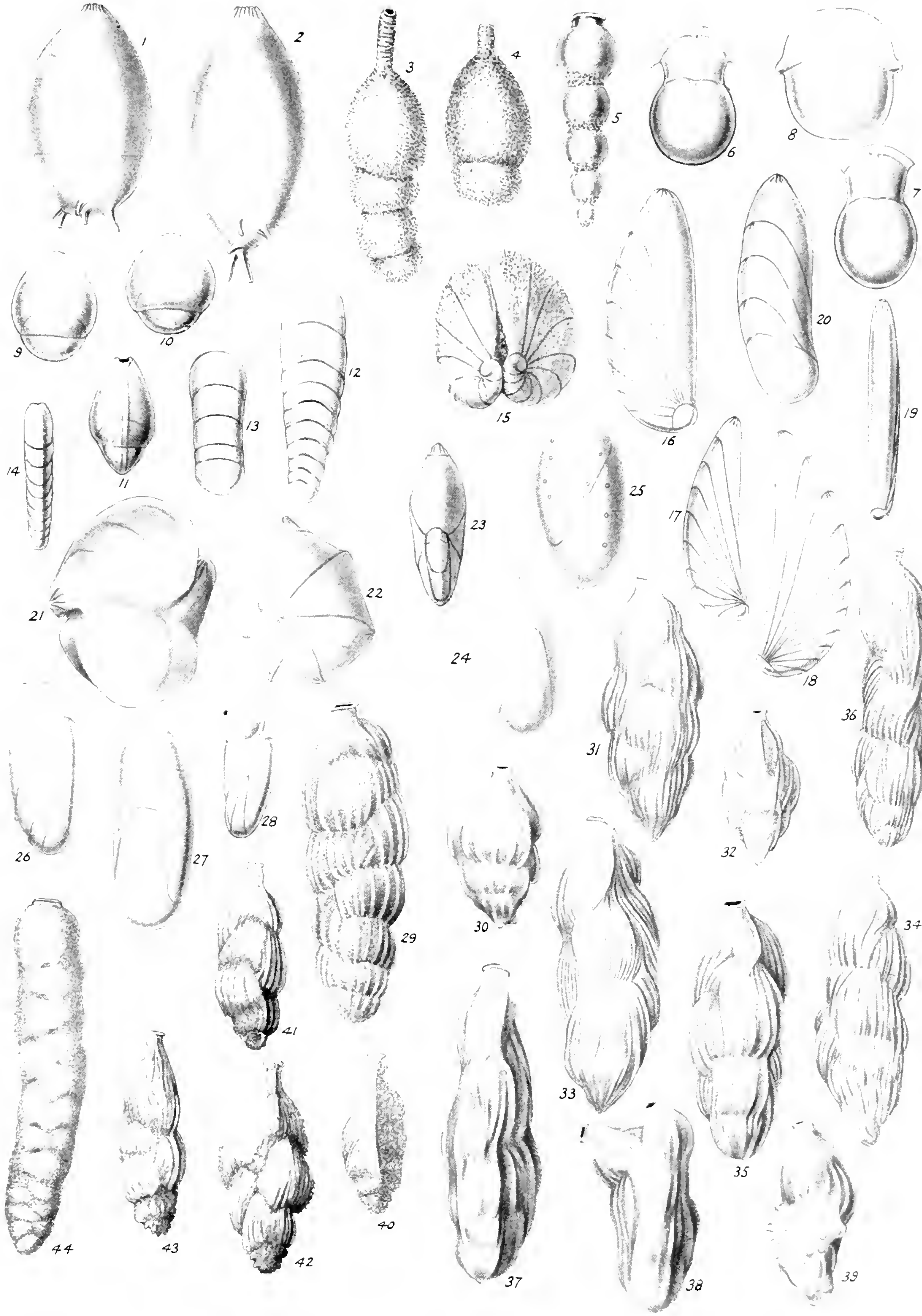
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PLATE XIII

Figs. 1, 2. *Globigerina dutertrei*, d'Orbigny (No. 307). Dorsal views: × 110.
Fig. 3. *Globigerina dutertrei*, d'Orbigny (No. 307). Ventral view: × 110.
Fig. 4. *Globigerina dutertrei*, d'Orbigny (No. 307). Edge-oral view: × 110.
Fig. 5. *Globigerina conglomerata*, Schwager (No. 308). Edge view: × 110.
Figs. 6, 7. *Globigerina conglomerata*, Schwager (No. 308). Dorsal views: × 110.
Fig. 8. *Globigerina conglomerata*, Schwager (No. 308). Ventral view: × 110.
Fig. 9. *Globigerina pachyderma* (Ehrenberg) (No. 310). Edge view: × 110.
Fig. 10. *Globigerina pachyderma* (Ehrenberg) (No. 310). Ventral view: × 110.
Fig. 11. *Globigerina pachyderma* (Ehrenberg) (No. 310). Dorsal view: × 110.
Fig. 12. *Globigerina pachyderma* (Ehrenberg) (No. 310). Thick-walled form; dorsal view: × 110.
Fig. 13. *Globigerina pachyderma* (Ehrenberg) (No. 310). Thick-walled form; ventral view: × 110.
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Figs. 16, 17. *Pullenia subcarinata* (d'Orbigny) (No. 316). Oral views: × 64.
Fig. 19. *Patellina corrugata*, Williamson (No. 326). Upper view; megalospheric: × 64.
Fig. 20. *Patellina corrugata*, Williamson (No. 326). Under view: × 64.
Fig. 21. *Patellina corrugata*, Williamson (No. 326). Upper view; microspheric young individual: × 64.
Fig. 22. *Patellina corrugata*, Williamson (No. 326). Upper view; megalospheric young individual: × 64.
Fig. 23. *Patellina corrugata* var.n. *formosa* (No. 327). Initial stage: × 64.
Figs. 24, 25. *Patellina corrugata* var.n. *formosa* (No. 327). Adult; upper views: × 64.
Fig. 26. *Patellinoides conica*, gen. et sp.n. (No. 328). Upper view: × 190.
Fig. 27. *Patellinoides conica*, gen. et sp.n. (No. 328). Under view: × 190.
Fig. 28. *Patellinoides conica*, gen. et sp.n. (No. 328). Edge view: × 190.
Fig. 29. *Patellinoides conica*, gen. et sp.n. (No. 328). Viewed as a transparent object in balsam. The half-tone lines represent the internal tubes connecting the chambers with the basal aperture: × 190.
Fig. 30. *Patellinoides depressa*, gen. et sp.n. (No. 329). Upper view: × 164.
Fig. 31. *Patellinoides depressa*, gen. et sp.n. (No. 329). Under view: × 164.
Fig. 32. *Patellinoides depressa*, gen. et sp.n. (No. 329). Edge view: × 164.
Fig. 33. *Patellinoides depressa*, gen. et sp.n. (No. 329). Viewed as a transparent specimen, showing the internal tubes. *Note*. Owing to the strongly limbate sutural lines the number of chambers appears to be doubled: × 164.
Fig. 34. *Discorbis cora* (d'Orbigny) (No. 330). Ventral view: × 110.
Fig. 35. *Discorbis cora* (d'Orbigny) (No. 330). Dorsal view: × 110.
Fig. 36. *Discorbis cora* (d'Orbigny) (No. 330). Edge view: × 110.
Fig. 37. *Discorbis vilardeboana* (d'Orbigny) (No. 333). Dorsal view: × 110.
Fig. 38. *Discorbis vilardeboana* (d'Orbigny) (No. 333). Ventral view: × 110
Fig. 39. *Discorbis vilardeboana* (d'Orbigny) (No. 333). Edge view: × 110

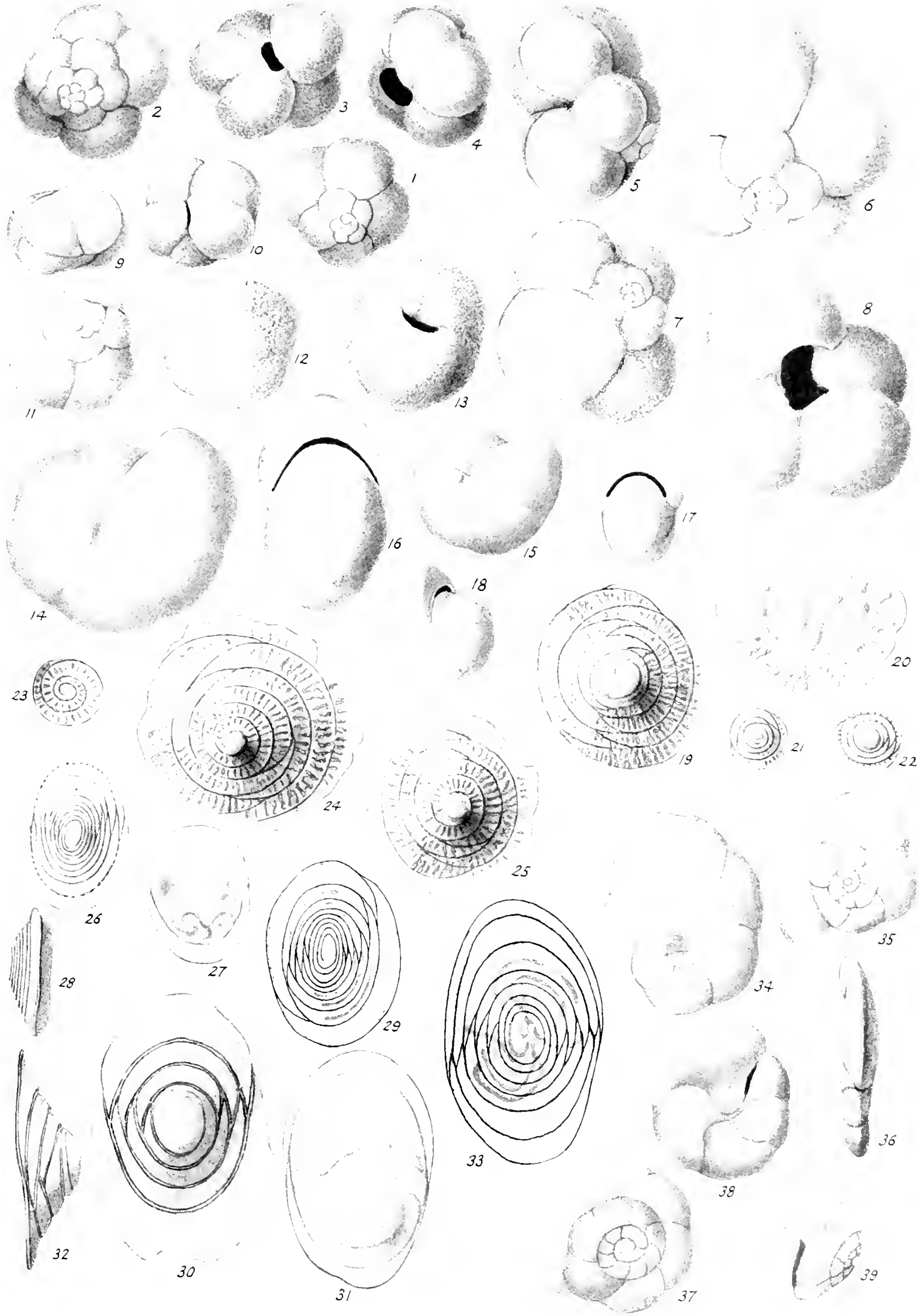
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PLATE XIV

Figs. 1, 3. *Discorbis peruviana* (d'Orbigny) (No. 335). Dorsal views: × 90.
Fig. 2. *Discorbis peruviana* (d'Orbigny) (No. 335). Ventral view: × 90.
Fig. 4. *Discorbis peruviana* (d'Orbigny) (No. 335). Edge view: × 90.
Figs. 5, 6. *Discorbis isabelleana* (d'Orbigny) (No. 338). Dorsal views: × 28.
Fig. 7. *Discorbis isabelleana* (d'Orbigny) (No. 338). Ventral view: × 28.
Fig. 8. *Discorbis isabelleana* (d'Orbigny) (No. 338). Edge view: × 28.
Fig. 9. *Discorbis plana*, sp.n. (No. 342). Dorsal view: × 64.
Fig. 10. *Discorbis plana*, sp.n. (No. 342). Ventral view: × 64.
Fig. 11. *Discorbis plana*, sp.n. (No. 342). Edge view: × 64.
Fig. 12. *Discorbis plana*, sp.n. (No. 342). Ventral view of specimen with attached young "bud": × 64.
Fig. 13. *Discorbis tricamerata*, sp.n. (No. 344). Dorsal view: × 110.
Fig. 14. *Discorbis tricamerata*, sp.n. (No. 344). Ventral view: × 110.
Fig. 15. *Discorbis tricamerata*, sp.n. (No. 344). Edge view: × 110.
Fig. 16. *Discorbis tricamerata*, sp.n. (No. 344). Viewed as a transparent object: × 110.
Fig. 17. *Discorbis bertheloti* (d'Orbigny) var. *complanata*, Sidebottom (No. 347). Dorsal view: × 110.
Fig. 18. *Discorbis bertheloti* (d'Orbigny) var. *complanata*, Sidebottom (No. 347). Ventral view: × 110.
Fig. 19. *Discorbis obtusa* (d'Orbigny) (No. 350). Dorsal view: × 110.
Fig. 20. *Discorbis obtusa* (d'Orbigny) (No. 350). Ventral view: × 110.
Fig. 21. *Discorbis obtusa* (d'Orbigny) (No. 350). Edge view: × 110.
Fig. 22. *Discorbis malovensis*, sp.n. (No. 351). Dorsal view: × 110.
Fig. 23. *Discorbis malovensis*, sp.n. (No. 351). Ventral view: × 110.
Fig. 24. *Discorbis malovensis*, sp.n. (No. 351). Edge view: × 110.
Fig. 25. *Discorbis coronata*, sp.n. (No. 353). Dorsal view: × 110.
Fig. 26. *Discorbis coronata*, sp.n. (No. 353). Ventral view: × 110.
Fig. 27. *Discorbis coronata*, sp.n. (No. 353). Edge view: × 110.
Fig. 28. *Discorbis coronata* (?) (No. 353). Dorsal view: × 110.
Fig. 29. *Discorbis coronata* (?) (No. 353). Ventral view: × 110.
Fig. 30. *Discorbis coronata* (?) (No. 353). Edge view: × 110.
Fig. 31. *Truncatulina lobatula* (?) (Walker and Jacob) (No. 356). Encysted young: × 48.
Fig. 32. *Truncatulina dispars* (d'Orbigny) (No. 357). Ventral view: × 110.
Fig. 33. *Truncatulina dispars* (d'Orbigny) (No. 357). Dorsal view: × 110.
Fig. 34. *Truncatulina dispars* (d'Orbigny) (No. 357). Edge view: × 110.
Fig. 35. *Truncatulina pseudoungeriana* (d'Orbigny) (No. 363). Edge view of specimen with accessory balloon-shaped chamber: × 74.
Figs. 36–39. *Truncatulina variabilis*, d'Orbigny (No. 358). Illustrating range of form: × 74.
Figs. 40, 41. *Anomalina umbilicatula*, sp.n. (No. 372). Side views: × 74.
Fig. 42. *Anomalina umbilicatula*, sp.n. (No. 372). Edge-oral view: × 74.

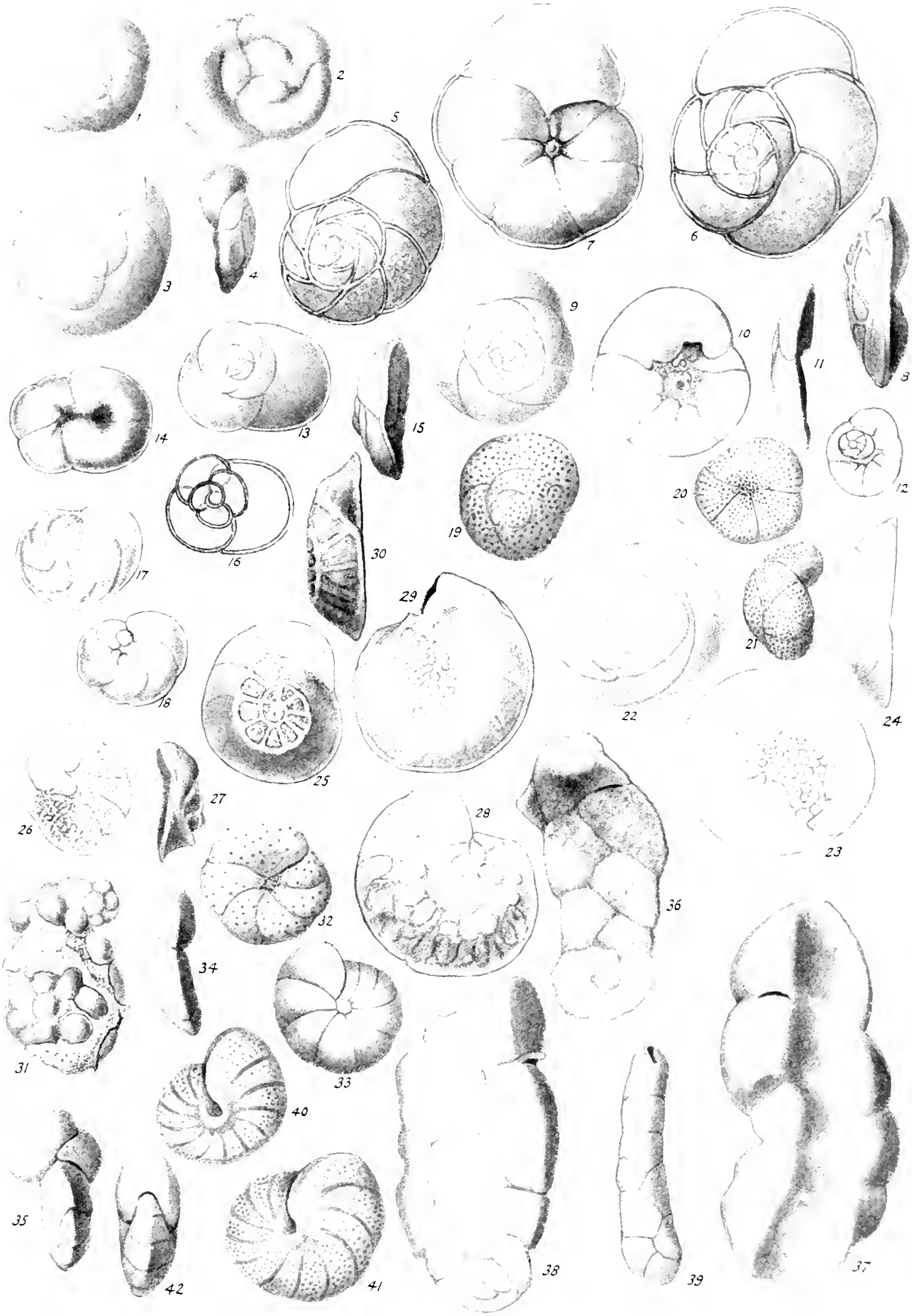
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PLATE XV

Figs. 1–14. *Anomalina vermiculata* (d'Orbigny) (No. 369). × 48.

1, dorsal, 2, ventral, 3, edge-oral views of young megalospheric form.
4, ventral, 5, dorsal, 6, edge-oral views in next stage of development.
7, ventral, 8, dorsal, 9, edge-oral views of half-developed form.
10, edge-oral, 11, ventral, 12, dorsal views of adult form.
13, a megalospheric specimen, half developed seen in optical section.
14, a microspheric specimen, half developed seen in optical section.

Fig. 15. *Anomalina vermiculata* (d'Orbigny) (?) (No. 369). Encysted young: × 48.
Fig. 16. *Pulvinulina umbonata* (Reuss) (No. 386). Edge-oral view: × 48.
Fig. 17. *Pulvinulina umbonata* (Reuss) (No. 386). Dorsal view: × 48.
Fig. 18. *Pulvinulina umbonata* (Reuss) (No. 386). Ventral view: × 48.
Fig. 19. *Carpenteria lobosa*, sp.n. (No. 373). × 19.
Fig. 20. *Pulvinulina patagonica* (d'Orbigny) (No. 388). Dorsal view: × 110.
Fig. 21. *Pulvinulina patagonica* (d'Orbigny) (No. 388). Ventral view: × 110.
Fig. 22. *Pulvinulina patagonica* (d'Orbigny) (No. 388). Edge-oral view: × 110.
Fig. 23. *Pulvinulina alvarezii* (d'Orbigny) (No. 390). Ventral view: × 74.
Fig. 24. *Pulvinulina alvarezii* (d'Orbigny) (No. 390). Dorsal view: × 74.
Fig. 25. *Pulvinulina alvarezii* (d'Orbigny) (No. 390). Edge view: × 74.
Figs. 26–36. *Pulvinulina karsteni* (Reuss) (No. 391). A series to illustrate the range of variation: × 74.

27, 29, 32, 35, dorsal views.
26, 28, 31, 34, ventral views.
30, 33, 36, edge views.

Fig. 37. *Pulvinulina peruviana* (d'Orbigny) (No. 392). Dorsal view: × 74.
Fig. 38. *Pulvinulina peruviana* (d'Orbigny) (No. 392). Ventral view: × 74.
Fig. 39. *Pulvinulina peruviana* (d'Orbigny) (No. 392). Edge view: × 74.

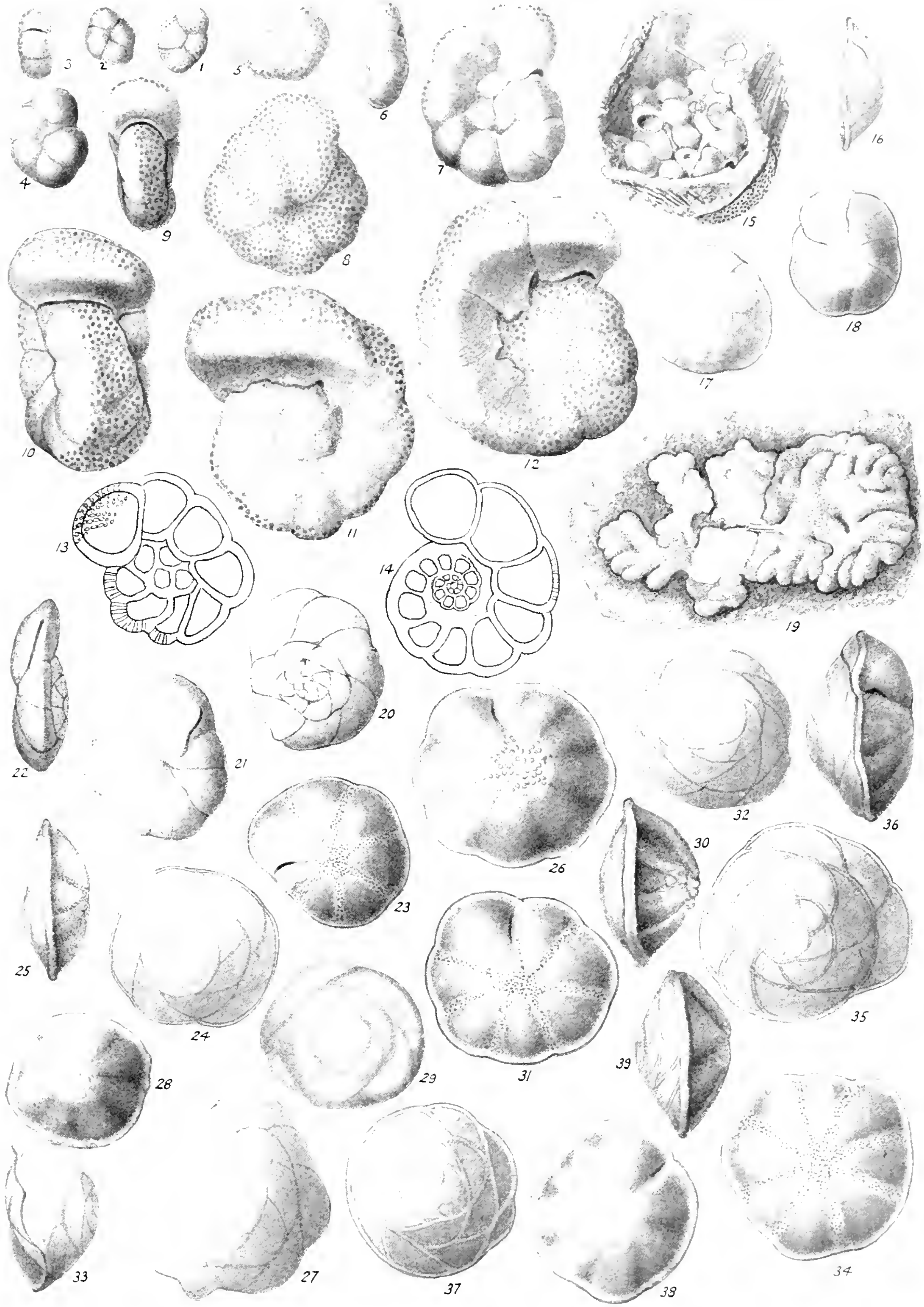

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PLATE XVI

Fig. 1. *Rotalia clathrata*, Brady (No. 395). Dorsal view of large specimen: × 48.
Fig. 2. *Rotalia clathrata*, Brady (No. 395). Ventral view of normal specimen: × 48.
Fig. 3. *Rotalia clathrata*, Brady (No. 395). Dorsal view of normal specimen: × 48.
Fig. 4. *Rotalia clathrata*, Brady (No. 395). Edge view of normal specimen: × 48.
Fig. 5. *Nonion incrassatum* (Fichtel and Moll) (No. 398). Side view: × 64.
Fig. 6. *Nonion incrassatum* (Fichtel and Moll) (No. 398). Front-edge view: × 64.
Fig. 7. *Nonion sloanii* (d'Orbigny) (No. 403). Side view: × 64.
Fig. 8. *Nonion sloanii* (d'Orbigny) (No. 403). Front-edge view: × 64.
Fig. 9. *Nonion grateloupi* (d'Orbigny) (No. 406). Front-edge view: × 64.
Fig. 10. *Nonion grateloupi* (d'Orbigny) (No. 406). Side view: × 64.
Fig. 11. *Nonionella chiliensis* (?) Cushman and Kellett (No. 411). Dorsal view: × 74.
Fig. 12. *Nonionella chiliensis* (?) Cushman and Kellett (No. 411). Ventral view: × 74.
Fig. 13. *Nonionella chiliensis* (?) Cushman and Kellett (No. 411). Edge view: × 74. The final chamber is broken away.
Note. The final chamber is broken and the surface eroded.
Fig. 14. *Nonionella iridea*, sp.n. (No. 410). Dorsal view: × 74.
Fig. 15. *Nonionella iridea*, sp.n. (No. 410). Ventral view: × 74.
Fig. 16. *Nonionella iridea*, sp.n. (No. 410). Front-edge view: × 74.
Fig. 17. *Nonionella auris* (d'Orbigny) (No. 409). Ventral view: × 74.
Fig. 18. *Nonionella auris* (d'Orbigny) (No. 409). Dorsal view: × 74.
Fig. 19. *Nonionella auris* (d'Orbigny) (No. 409). Front-edge view: × 74.
Fig. 20. *Elphidium incertum* (Williamson) (No. 412). Side view: × 64.
Fig. 21. *Elphidium incertum* (Williamson) (No. 412). Front-edge view: × 64.
Fig. 22. *Elphidium excavatum* (Terquem) (No. 413). Side view: × 64.
Fig. 23. *Elphidium excavatum* (Terquem) (No. 413). Front-edge view: × 64.
Fig. 24. *Elphidium alvarezianum* (d'Orbigny) (No. 415). Side view: × 64.
Fig. 25. *Elphidium alvarezianum* (d'Orbigny) (No. 415). Front-edge view: × 64.
Figs. 26, 27. *Elphidium magellanicum*, sp.n. (No. 416). Side views: × 64.
Fig. 28. *Elphidium magellanicum*, sp.n. (No. 416). Front-edge view: × 64.
Fig. 29. *Elphidium lessonii* (d'Orbigny) (No. 417). Side views: × 64.
Fig. 30. *Elphidium lessonii* (d'Orbigny) (No. 417). Front-edge views: × 64.
Fig. 31. *Elphidium owenianum* (d'Orbigny) (No. 419). Side view: × 64.
Fig. 32. *Elphidium owenianum* (d'Orbigny) (No. 419). Front-edge view: × 64.
Figs. 33, 34, 36. *Dendronina papillata* (Heron-Allen and Earland) (No. 59). Specimens in secondary stage of growth showing development of tubular outgrowth: × 28.
Fig. 35. *Dendronina papillata* (No. 59). A detached basal pad seen from below, showing branching "astrorhizid" primordial chamber: × 28.
Figs. 37, 38. *Dendronina papillata* (No. 59). Detached fragments believed to represent the terminal chamber of the organism: × 28.
Fig. 39. *Technitella nitida*, sp.n. (No. 62). × 28.


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PLATE XVII

Fig. 1. *Dendronina papillata* (Heron-Allen and Earland) (No. 59). Interior of small basal pad showing "astrorhizid" chamber: × 42.

Fig. 2. *Dendronina papillata* (Heron-Allen and Earland) (No. 59). First stage of growth, the basal pad: × 16.

Fig. 3. *Dendronina papillata* (Heron-Allen and Earland) (No. 59). Basal pad in advanced stage of growth: × 34.

Figs. 4–6. *Psammosphaera fusca*, Schulze (No. 60). Sessile specimens of abnormal form due to the breaking away of large incorporated sand grains: × 20.

Fig. 7. *Tholosina vesicularis* (Brady) var. *erecta*, Heron-Allen and Earland (No. 68). × 20.

Fig. 8. *Tholosina vesicularis* (Brady) var. *erecta*, Heron-Allen and Earland (No. 68). Specimen showing branching tube: × 20.

Figs. 9, 10. *Protobotellina cylindrica*, Heron-Allen and Earland (No. 81). × 3.

Fig. 11. *Protobotellina cylindrica*, Heron-Allen and Earland (No. 81). Longitudinal section. × 3.

Fig. 12. *Protobotellina cylindrica*, Heron-Allen and Earland (No. 81). View of aperture: × 12.

Fig. 13. *Protobotellina cylindrica*, Heron-Allen and Earland (No. 81). Cross-section of tube: × 12.

Fig. 14. *Trochammina malovensis*, Heron-Allen and Earland (No. 109). Edge view: × 80.

Fig. 15. *Trochammina malovensis*, Heron-Allen and Earland (No. 109). Ventral view: × 80.

Fig. 16. *Trochammina malovensis*, Heron-Allen and Earland (No. 109). Dorsal view: × 80.

Fig. 17. *Trochammina malovensis*, Heron-Allen and Earland (No. 109). Edge view of specimen in balsam: × 80.

Fig. 18. *Trochammina malovensis*, Heron-Allen and Earland (No. 109). Ventral view of specimen in balsam: × 80.

Fig. 19. *Trochammina malovensis*, Heron-Allen and Earland (No. 109). Dorsal view of specimen in balsam: × 80.

Figs. 20–22. *Heronallenia (Discorbis) kempii*, Heron-Allen and Earland (No. 354). Dorsal view of early stages: × 80.

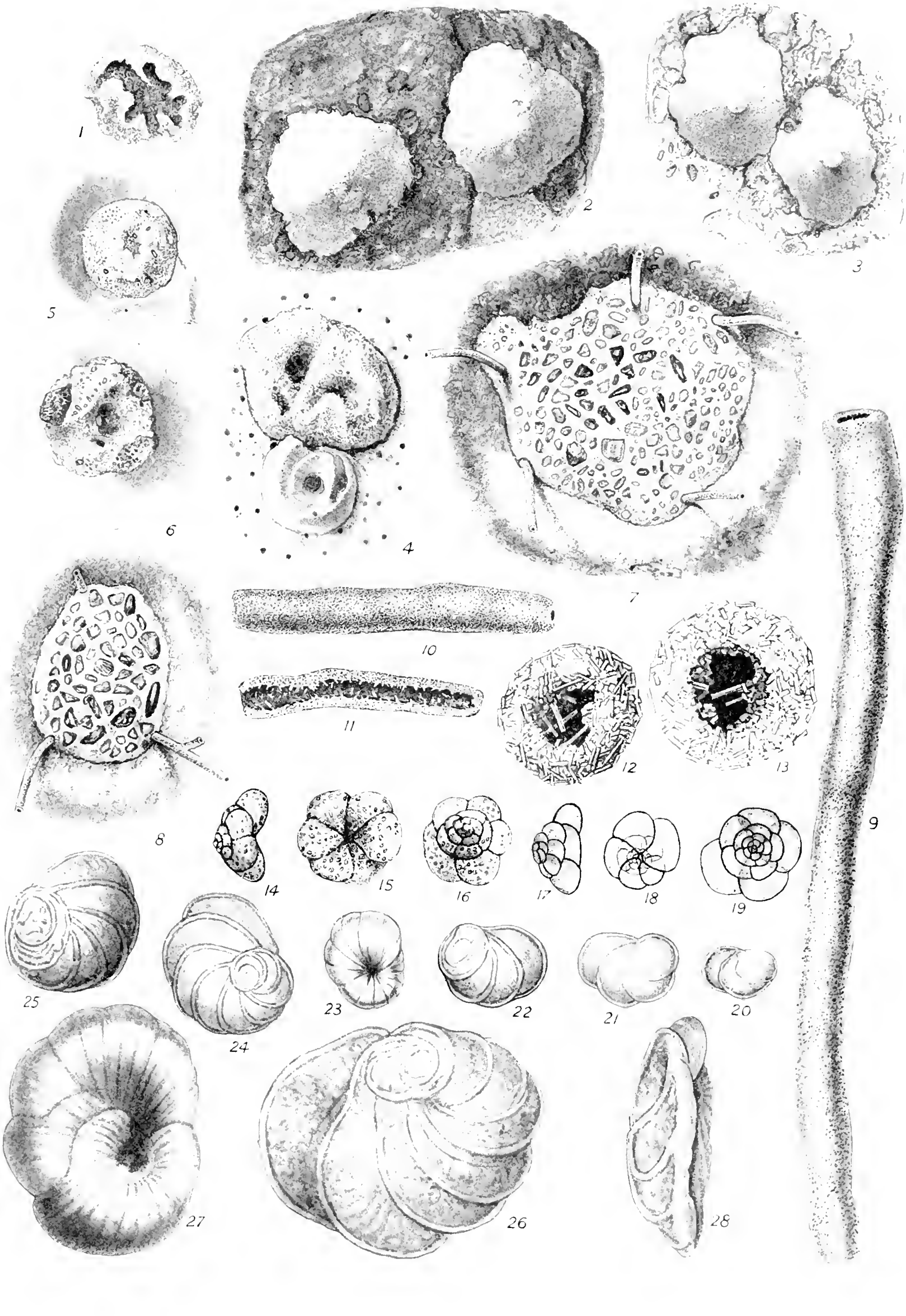
Fig. 23. *Heronallenia (Discorbis) kempii*, Heron-Allen and Earland (No. 354). Ventral view of early stage: × 80.

Figs. 24, 25. *Heronallenia (Discorbis) kempii*, Heron-Allen and Earland (No. 354). Dorsal views of immature shells: × 60.

Fig. 26. *Heronallenia (Discorbis) kempii*, Heron-Allen and Earland (No. 354). Dorsal view of adult shell: × 50.

Fig. 27. *Heronallenia (Discorbis) kempii*, Heron-Allen and Earland (No. 354). Ventral view of adult shell: × 50.

Fig. 28. *Heronallenia (Discorbis) kempii*, Heron-Allen and Earland (No. 354). Edge view of adult shell: × 50.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on behalf of the Government of the Dependencies of the Falkland Islands

FORAMINIFERA

PART I. THE ICE-FREE AREA OF THE FALKLAND ISLANDS AND ADJACENT SEAS

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CAMBRIDGE
AT THE UNIVERSITY PRESS
1932

Price twenty-five shillings net

Cambridge University Press
Fetter Lane, London

New York
Bombay, Calcutta, Madras
Toronto
Macmillan

Tokyo
Maruzen Company, Ltd

PRINTED
IN GREAT BRITAIN
BY
WALTER LEWIS MA
AT
THE CAMBRIDGE
UNIVERSITY
PRESS